

FOIA MARKER

This is not a textual record. This is used as an administrative marker by the William J. Clinton Presidential Library Staff.

Collection/Record Group: Clinton Presidential Records
Subgroup/Office of Origin: Council of Economic Advisers
Series/Staff Member: Joseph Stiglitz
Subseries:

OA/ID Number: 9566
FolderID:

Folder Title:
Information Infrastructure Task Force (also known as NIITF) [1]

Stack:	Row:	Section:	Shelf:	Position:
S	20	5	5	1

Withdrawal/Redaction Sheet

Clinton Library

DOCUMENT NO. AND TYPE	SUBJECT/TITLE	DATE	RESTRICTION
001. fax	IITF Secretariat to Distribution List re: Information Infrastructure [partial] (1 page)	02/09/1995	P3/b(3)

COLLECTION:

Clinton Presidential Records
Council of Economic Advisers
Joseph Stiglitz
OA/Box Number: 9566

FOLDER TITLE:

Information Infrastrucutre Task Force (also known as NIITF) [1]

2019-0203-F

jm2834

RESTRICTION CODES

Presidential Records Act - [44 U.S.C. 2204(a)]

- P1 National Security Classified Information [(a)(1) of the PRA]
- P2 Relating to the appointment to Federal office [(a)(2) of the PRA]
- P3 Release would violate a Federal statute [(a)(3) of the PRA]
- P4 Release would disclose trade secrets or confidential commercial or financial information [(a)(4) of the PRA]
- P5 Release would disclose confidential advice between the President and his advisors, or between such advisors [(a)(5) of the PRA]
- P6 Release would constitute a clearly unwarranted invasion of personal privacy [(a)(6) of the PRA]

C. Closed in accordance with restrictions contained in donor's deed of gift.

PRM. Personal record misfile defined in accordance with 44 U.S.C. 2201(3).

RR. Document will be reviewed upon request.

Freedom of Information Act - [5 U.S.C. 552(b)]

- b(1) National security classified information [(b)(1) of the FOIA]
- b(2) Release would disclose internal personnel rules and practices of an agency [(b)(2) of the FOIA]
- b(3) Release would violate a Federal statute [(b)(3) of the FOIA]
- b(4) Release would disclose trade secrets or confidential or financial information [(b)(4) of the FOIA]
- b(6) Release would constitute a clearly unwarranted invasion of personal privacy [(b)(6) of the FOIA]
- b(7) Release would disclose information compiled for law enforcement purposes [(b)(7) of the FOIA]
- b(8) Release would disclose information concerning the regulation of financial institutions [(b)(8) of the FOIA]
- b(9) Release would disclose geological or geophysical information concerning wells [(b)(9) of the FOIA]



THE SECRETARY OF COMMERCE

Washington, D.C. 20230

FEB - 3 1995

CP: JB
CWEric W. V.
attendingTask Force
(NIITF) Infrastructure

MEMORANDUM FOR: HEADS OF EXECUTIVE DEPARTMENTS AND AGENCIES

FROM: RONALD H. BROWN

SUBJECT: INFORMATION INFRASTRUCTURE TASK FORCE MEETING

You are invited to attend the Sixth Information Infrastructure Task Force (IITF) meeting on Wednesday, February 15, 1995, from 2:00 - 4:00 p.m., in Room 4830 at the Department of Commerce.

The main purpose of this meeting is to discuss how our 1995 efforts and activities will support the broader goals of the Clinton Administration. Our meeting agenda includes a discussion on our Global Information Infrastructure (GII) initiatives and the release of the *GII: Agenda for Cooperation*, an unveiling and discussion of the NII Public Education Campaign, and a brief report on the Virtual Conference on Electronic Government. Please come prepared to offer your Agency's perspective on these issues. The IITF Committee Chairs will also give a brief presentation highlighting their 1995 goals. Briefing book information and a complete agenda will be distributed a week before the meeting.

Due to limited seating availability, we request that no more than two representatives of your Department or Agency attend the meeting. Only one of these representatives, however, may participate in the roundtable discussions. Please fax your reply to Yvette Barrett at (202) 482-0979 by Monday, February 13, and specify the principal representing your Department or Agency. If you have any questions, Ms. Barrett can also be reached at (202) 482-1835 or ybarrett@ntia.doc.gov (e-mail).

Thank you for your participation. I look forward to seeing you on February 15.

Withdrawal/Redaction Marker

Clinton Library

DOCUMENT NO. AND TYPE	SUBJECT/TITLE	DATE	RESTRICTION
001. fax	IITF Secretariat to Distribution List re: Information Infrastructure [partial] (1 page)	02/09/1995	P3/b(3)

COLLECTION:

Clinton Presidential Records
Council of Economic Advisers
Joseph Stiglitz
OA/Box Number: 9566

FOLDER TITLE:

Information Infrastrucutre Task Force (also known as NIITF) [1]

2019-0203-F
jm2834

RESTRICTION CODES

Presidential Records Act - [44 U.S.C. 2204(a)]

P1 National Security Classified Information [(a)(1) of the PRA]
P2 Relating to the appointment to Federal office [(a)(2) of the PRA]
P3 Release would violate a Federal statute [(a)(3) of the PRA]
P4 Release would disclose trade secrets or confidential commercial or
financial information [(a)(4) of the PRA]
P5 Release would disclose confidential advice between the President
and his advisors, or between such advisors [a)(5) of the PRA]
P6 Release would constitute a clearly unwarranted invasion of
personal privacy [(a)(6) of the PRA]

C. Closed in accordance with restrictions contained in donor's deed
of gift.

PRM. Personal record misfile defined in accordance with 44 U.S.C.
2201(3).

RR. Document will be reviewed upon request.

Freedom of Information Act - [5 U.S.C. 552(b)]

b(1) National security classified information [(b)(1) of the FOIA]
b(2) Release would disclose internal personnel rules and practices of
an agency [(b)(2) of the FOIA]
b(3) Release would violate a Federal statute [(b)(3) of the FOIA]
b(4) Release would disclose trade secrets or confidential or financial
information [(b)(4) of the FOIA]
b(6) Release would constitute a clearly unwarranted invasion of
personal privacy [(b)(6) of the FOIA]
b(7) Release would disclose information compiled for law enforcement
purposes [(b)(7) of the FOIA]
b(8) Release would disclose information concerning the regulation of
financial institutions [(b)(8) of the FOIA]
b(9) Release would disclose geological or geophysical information
concerning wells [(b)(9) of the FOIA]

NTIA/OPCM
FAX



UNITED STATES DEPARTMENT OF COMMERCE

National Telecommunications and
Information Administration

Room 4888, HCH Building
Washington, D.C. 20230

TO: See Distribution List Below.		FAX:
		PHONE:
FROM: IITF Secretariat Office of Policy Coordination and Management		FAX: (202) 482-0979
		PHONE: (202) 482-1835
DATE: February 9, 1995.	PAGES: This + 1 Pages	

MESSAGE

Information Infrastructure Task Force
(Agency Representatives)

	Office	Fax
Ms. Melissa Allen (Transportation)	202-368-2332	202-368-9634
Mr. Lawrence Barrett (SBA)	202-205-6708	202-205-7084
Mr. Richard Beaird (State)	202-847-5832	202-847-5957
Mr. Herbert Becker (LOC)	202-707-8207	202-707-0955
Mr. Wally Beyer (REA/USDA)	202-720-9540	202-720-1725
Mr. Walter Broadnax (HHS)	202-690-7431	202-690-7755
(b)(3)		
Ms. Carol Darr (OGC/DOC)	202-482-1307	202-482-1865
Mr. Donald C. Demitros (HUD)	202-708-0308	202-708-3577
Ms. Michele Farquhar (NTIA/DOC)	202-482-1835	202-482-0979
Mr. James Flyzik (Treasury)	202-622-1592	202-622-1595
Ms. Bernice Friedlander (Consumer Affairs)	202-395-7900	202-395-7901
Ms. Cita Furlani (NIST/DOC)	301-975-4529	301-848-7242
Honorable John H. Gibbons (White House)	202-456-7118	202-456-8021
Mr. Adam Golodner (REA/USDA)	202-720-9542	202-720-1725
Ms. Carol Hamilton (OPA/DOC)	202-482-8001	202-482-5168
Ms. Janet Handal (ARPA)	202-395-1053	202-395-7279
Ms. Sallyanne Harper (EPA)	202-280-4600	202-280-0835
Ms. Nada Harris (Veterans Affairs)	202-535-8554	202-535-8569
Mr. Lee Holcomb (NASA)	202-358-2747	202-358-3557
Mr. Jim Ingraham (TVA)	615-632-3403	615-632-3616
Mr. Skip Johns (OSTP)	202-456-8048	202-456-6023
Dr. Anita Jones (Defense)	703-697-5871	703-893-7167
Mr. Tom Kalil (NEC)	202-456-2801	202-456-2223
Mr. Charles Kalina (HPCCIT)	301-402-4100	301-402-4080
Ms. Debra Knopman (Interior)	202-208-3138	202-371-2815
Mr. Robert E. Litan (Justice)	202-514-2410	202-618-2645
Ms. Elizabeth Lyle (DOC)	202-482-4127	202-482-4191
Mr. David Lytel (OSTP)	202-456-6037	202-456-6023
Ms. Vonya McCann (State)	202-847-5832	202-847-5957
Mr. Bruce McConnell (OMB)	202-395-3785	202-395-5167
Mr. David Nelson (Energy)	202-588-0095	202-588-1009
Mr. Michael Nelson (OSTP)	202-456-6039	202-456-6023
Dr. Merrill Patrick (NSF)	703-308-1900	703-308-0577
Dr. Robert M. Pepper (FCC)	202-418-2030	202-418-2807
Mr. Robert Portman (Labor)	202-219-6045	202-219-4315
Ms. Anne Reed (USDA)	202-720-3590	202-720-2191
Mr. Robert A. F. Reisner (USPS)	202-268-2870	202-268-8269
Ms. Linda Roberts (Education)	202-401-1444	202-401-3093
Mr. Jonathan Sallet (Commerce)	202-482-4127	202-482-4191
Mr. Greg C. Simon (White House)	202-456-6222	202-456-6231
Mr. Robert Stein (Commerce)	202-482-4248	202-482-2741
Honorable Joe Stiglitz (CEA)	202-395-5038	202-395-6958
Mr. Thomas Sugrue (NTIA/DOC)	202-482-1831	202-482-1835
Mr. Jim Vollman (Employment & Training)	202-219-8854	202-219-8643
Ms. Jane Wales (OSTP)	202-456-2894	202-456-6028
Mr. Robert Woods (GSA)	202-208-7493	202-501-2772
Mr. Paul Young (NSF)	703-308-1900	703-308-0577

[001]

TO: Joe Stiglitz

fax 395-6958

FROM: Ray Squitieri

Eric Heides called Tuesday to urge us to finish the discounting chapter, even if some editorial details are left for later. I have made the changes we discussed Monday, and propose to send it out to your other coauthors, with a note along the lines of the attached, asking them for turnaround by Monday so that I may incorporate their changes and get it to Toronto next Wednesday. *ok?*

This Afternoon
J. 17 1145

May 17, 1995

TO: Kenneth J. Arrow
William R. Cline
Karl-Goran Maler
Mohan Monasinghe

FROM: Joseph Stiglitz
fax: 202-395-6958

SUBJECT: Revised Draft of Discounting Chapter

Attached you will find the revised draft of our chapter on discounting. In order to meet IPCC deadlines, please send me and corrections by noon Monday, June 22.

The revised draft includes many suggestions made during the recent government review. The reviewers focused on several major themes:

1. Provide a more balanced presentation between the "prescriptive" and "descriptive" views.

The current draft reduces the introductory material (much of which had been used to support the prescriptive case), relocating most of it to Annex 3B, and balances the scales between the two approaches in the body of the report.

2. Help the nonspecialist reader by identifying the essential points he will need to understand.

Reviewers asked for clearer deliniation between central points and peripheral points, and for a less use of technical language in the core of the report. The body of the current draft has been pruned to 12 pages, with many details from previous drafts now moved to Annex 2B. The body is now written for the nonspecialist, with a few exceptions where technical terms seemed important to the exposition.

Reviewers also contributed hundreds of smaller suggestions. We have considered all of these suggestions, incorporating those that seemed appropriate into the text.

NII

cc: JS

Joe

OFFICE OF THE SECRETARY
OFFICE OF POLICY AND STRATEGIC PLANNING
THE DEPARTMENT OF COMMERCE

14th and Constitution Avenue, N.W., Room 5834
Washington, D.C. 20230
(202) 482-4127
(202) 482-4191 FAX

TO: DIST

FROM: Elizabeth Lyle

FAX NO.: _____

NUMBER OF PAGES INCLUDING COVER: 10

MESSAGE: Attached document is

"Close Hold" we need comments
back by wed, Feb 15, CoB.

DRAFT 2/12/95 9:45 p.m.

NII Workplan

I. Goals

The National Information Infrastructure will connect Americans to their future. It will spur innovation and provide U.S. consumers with the benefits of real competition: lower prices, higher quality and more choice among an increasing array of information products and services.

Construction of the National, and Global, Information Infrastructure will assist Americans and create jobs by opening competitive markets, both at home and abroad; by providing all Americans with the tools they need, especially education and training, to achieve a higher standard of living for themselves and their families; and by the re-invention of less costly, more effective and more responsive government at all levels.

The promise of the NII is, in reality, the promise of a re-invigorated and more prosperous nation -- successful in the arena of global competition and adapting to the increasing pace of technological innovation -- that engages the abilities and fulfills the information requirements of every American.

II. Priorities of Federal Action

To achieve these goals, the Clinton Administration has, and will continue, to:

1. Open markets, both at home and abroad, in order (i) to create a framework of real competition that will spur U.S. competitiveness through access to new markets and new means of productivity; (ii) to create U.S. jobs; and (iii) to provide consumers with the benefits of lower prices, higher quality and more choice.
2. Connect Americans to the emerging NII, especially by linking classrooms and libraries.
3. Establish the federal government as a model of less costly, more effective and more responsive government.

III. Barriers to Success

In each priority area, and in the other important ways, the Administration will work towards the goal of the NII/GII by confronting barriers to innovation.

Barriers are circumstances (both real and imagined) that block the benefits of real competition or, in the case of re-inventing government, that blind governments to the possibility of more effective and more responsive action.

One barrier to achievement of our first priority -- opening foreign and domestic markets -- comes from the fears of regulated businesses that simultaneously embrace and fear the advent of real competition. These businesses -- providing cable, long-distance and local telephone services -- know that their long-term prosperity depends on competitive success in an open marketplace. But they fear that the process of un-doing the regulatory structure of the past may tilt the playing field of the future.

The first barrier to confront, then, is the difference between legitimate fears of market participants and the scrambling for competitive advantage. And that can be done, in large part, by adherence to simple principles that will benefit competitive markets -- and not just one or more competitors: Competition is preferable to monopoly; monopoly power must never be confused with competition; and, to provide concrete benefits to Americans, competition must be real, not imagined or illusory.

Barriers in the marketplace are not limited, of course, just to the current structure of regulation. In pursuing our priorities, the Clinton Administration will look carefully at the different stages of market activity: From early research & development, where insufficient incentives exist for investment in long-term, high-risk R&D; through private investment, which requires a continuation of sound macro-economic policy and targeted incentives, to issues of market structure, which require vigorous enforcement of the antitrust laws in addition to the reformation of regulation; to artificial constraints on demand, which may arise from simple lack of information about the power of information technology.

Barriers can exist in the public sector as well. Our second priority -- connecting Americans to the NII -- requires an adequate supply of public goods, most notably schools and libraries. This nation has a long tradition of universal service; sometimes provided through community-base institutions, like schools and libraries; sometimes provided directly to individuals, like basic telephone service. That tradition must, however, evolve to meet the changing world of new information technology. That is why the President and Vice President have called on private industry to work in partnership with the federal, state and local governments to ensure that by the year 2000 every classroom, library, hospital and clinic in the United States is connected to the NII.

Our third priority -- a more effective and responsive government -- offers government itself the chance to work better by the use of information technology and offer the federal government, through the Vice President's leadership, the opportunity to serve as a model for governments across the country and around

the world.

IV. The Job of the Federal Government

In each of these areas of emphasis, the federal government has a critical role to play. Governments can -- and must -- open markets. Governments can -- and must -- continue the American tradition of universal service. Governments can -- and must -- re-invent their own operations.

Most of all, government can -- and must -- get out of the way. In a world of global competition and rapidly advancing technology, the job of government is to break down barriers and create opportunities -- and then let Americans take full advantage of the opportunities provided by the information age.

Government must confront barriers as effectively as it knows how. That means using every tool at its disposal, ranging from the bully pulpit of national leadership, to regulatory reform, to federal legislative action, to working with state and local governments to enlisting the private sector in voluntary action. It means acting with speed and flexibility to achieve the goals of the NII.

V. Action Items

The promise of the NII/GII can only be achieved if we take meaningful action in several key areas, including international policy, information policy, applications, and telecommunications policy.

A. International Action Items

International actions directly further the priority of opening markets abroad. They also help support in an international context the priorities of connecting people to social uses of information infrastructures and they provide an opportunity for the federal government to demonstrate world leadership in the use of information technology to re-invent government.

Much has already been done. From the Vice President's articulation of the Buenos Aires principles in 1994, through their discussion at APEC and the communique issued at the Hemispheric Summit, the basic agenda for the GII has gathered momentum.

Key action items for 1995 include:

- The G-7 Ministerial on the Information Society
- Review of Foreign Ownership Restrictions both in regulatory and legislative fora (and relationship to market access)

- Satellite issues
 - Intelsat/Inmarsat (and relation to market access)
 - WRC 95
- Review of Space Launch Policy (e.g., quotas)
- Review of role of multi-lateral institutions

B. Information Policy Issues

Information policy issues are critical to the creation of open, competitive markets in which sufficient incentives will exist to encourage the free flow of content. Information infrastructure would be of little use, of course, if it entailed just the construction of conduits or information appliances. Fundamental to the idea of an NII is the simple fact that people want to be able to send and receive content -- and want to be able to keep personal or business information private. The protection of content is, therefore, a critical element of the Administration's first priority.

Government's use of information is, as well, the cornerstone of the Administration's third priority -- the use of information technology to re-invent government.

Much has already been done. The Administration has emphasized internationally the importance of the flow of content, free from artificial restraints or quota. Domestically, the Administration has issued for comment a "green paper" proposing the ways that our intellectual property should be modified in light of the increasing use of digital technology. Other activities also serve to emphasize the importance of privacy and security.

The key action items for 1995 include:

Intellectual Property Rights

- Final review and publication of the IPR recommendations as an Administration "white paper"

Privacy

- Publication of "Privacy Guidelines"
- Consideration of Creation of Privacy Office/Commission

- Seek voluntary adherence by business organizations to Administration's proposed privacy guidelines
- Check for consistency between IITF's privacy proposal and other Administration proposals (e.g., INS) before sending the proposal to the Hill

Government Information

- Define core set of information all agencies should have on-line
- Well-publicized training initiative
- Include access to government information in public outreach campaign
- Provide measurements of how much information and how much use has come from information that we have put on-line
- Public display of government on-line efforts (possibly future IITF meeting)
- Security
 - Promote Public Key Infrastructures
 - Set Forth Defensive Strategy for Addressing Security Issues
 - Publish NII Security Plan

C. Applications

In 1994, the Administration described the benefits of NII applications, identified some of the ongoing programs or initiatives to promote these applications, and identified some of the barriers to use of these applications. In 1995, the Administration will continue its work by addressing a series of challenges.

Development and diffusion of applications are central to the Administration's second priority: Connecting Americans to the emerging NII, especially by linking classrooms and libraries.

Successful prosecution of that goal includes: (i) ensuring that senior Administration officials are responsible for resolving barriers to the realization of the NII and its applications, (ii) focusing agency attention on the relationship

between the NII and their core missions, (iii) developing concrete goals and milestones for the accomplishment of NII-related tasks as part of Administration initiatives, (iv) working with "communities of interest" that have special interest in some types of NII applications, and (v) working to ensure that agencies have people with the relevant skills, both at the policy and operational levels, to promote and use the NII.

Key action items for 1995 include:

- Emphasizing K-12 Elementary Schools and Libraries as a priority in meeting the Vice President's goal of linking classrooms, libraries, hospitals and clinics to the NII by the year 2000,
- Working with Fortune 500 companies to promote corporate "Adopt-a-School" and similar programs
- Rolling out of the Technology Learning Challenge
- Promoting "train the trainers" approach
- Rallying around TIAAP --- providing models
- Creating an Education/Libraries Action Plan (Farquar)

D. Telecommunications Policy Issues -- Telecom Legislation

The NII is much more than telecommunications but, because of the legacy of regulatory structures derived in the main from the Communications Act of 1934, the promotion of real competition in the telecommunications markets is a critical ingredient of the first priority: Opening domestic markets in order (i) to create a framework of real competition that will spur U.S. competitiveness through access to new markets and new means of productivity; (ii) to create U.S. jobs; and (iii) to provide consumers with the benefits of lower prices, higher quality and more choice.

The Administration will work in 1995, as it worked in 1994, towards the successful passage of bi-partisan telecommunications legislation.

Critical priorities for the Administration in pursuing telecommunications legislation include the following sets of issues:

- Telephony
- Opening markets to real competition

- Ensuring that de-regulation does not boost consumer phone bills
- Ensuring the expert participation of the Department of Justice
- Opposing procedures that would invite litigation and/or delay competition needlessly
- Supporting the general idea of price caps if correctly implemented (and note how states are using them), but do not support federal preemption of state choice, which runs risk of raising rates if applied to basic telephony

-- Cable

- Protecting consumers from unregulated monopoly pricing. We are prepared to consider the impact of new services provided in properly defined product and geographic markets
- Permitting the FCC's 214 process to go forward
- Prohibiting telco in-region acquisition of cable, with review after five years to see if competitive markets exist, because we believe telcos and cable systems shouldn't be able to buy each other out until they start competing
- Careful consideration of the problems faced by rural systems
- Consideration of auctioning off the right to provide service to the lowest bidder

Regulatory Flexibility

- Careful consideration of concepts similar to the Administration's "Title VII: proposal

Universal Service

- Support universal service provisions with consideration of (i) multiple carriers of last resort and (ii) state preemption.
- Consider legislative means needed to meet the goal of linking classrooms, libraries, hospitals and clinics by the year 2000.

Mass Media

- Consider current restrictions on cross-ownership

PBS

- Support PBS, but support changes in PBS

VI. Inter-Agency Coordination

Effective accomplishment of the Administration's proprieties will require focus, disciplined action, and an agenda that consistently monitors and measures our progress.

A. FOCUS

An important means of focusing attention is, of course, agreement upon and implementation of this NII workplan. Toward that end, the workplan should be implemented through the IITF, which is the premiere means by which the Administration coordinates the NII-activities of its constituent parts.

B. DISCIPLINED ACTION

We must insist upon effective Inter-Agency Action and coordination of existing Vehicles (including, e.g., IITF, NIIAC, Public Education Campaign) including emphasizing the importance of NII activities within the Administration.

Among the tasks to be coordinated on an inter-agency basis are:

- Increasing the Priority of NII Activities within Agencies of the Federal Government
- Message Development and Delivery
 - Sharpening Differences
 - Personalizing the Impacts
 - "Speakers' Bureau"
- Business Outreach
- Public Interest Outreach
- Legislative Outreach
- State and Local Government Outreach

Effective coordination will require inter-agency consultation on a regular basis, perhaps daily by telephone and weekly in person, in order to chart the course of progress of various work items.

C. AGENDA

- Using this Workplan as a starting point, the Administration should conduct regular reviews of progress attained towards the key action items
- Coordination will be enhanced through the construction (and updating) of an NII timeline

<u>Distribution</u>		<u>Phone</u>	<u>Fax</u>
Michael Gill	OVP	456-6486	456-7044
Steve Ricchetti	WH/Leg Affairs	456-6493	456-2604
Janet Murguia	WH/Leg Affairs	456-6620	456-2604
Joe Stiglitz	CEA	395-5036	395-6958
Jon Baker	CEA	395-5614	395-6809
Bo Cutter	NEC	456-5355	456-1605
X Tom Kalll	NEC	456-5366	456-2223
Chris Edley	OMB	395-3120	395-4639
Sally Katzen	OMB/OIRA	395-4852	395-3047
X Bruce McConnell	OMB/OIRA	395-3785	395-5167
Skip Johns	OSTP	456-6033	456-6023
X Mike Nelson	OSTP	456-6039	456-6023
David Barram	DOC	482-5880	482-3610
Jonathan Sallet	DOC	482-4127	482-4191
X Larry Irving	DOC/NTIA	482-1840	482-1635
Ann Bingaman	DOJ/Antitrust	514-2401	616-2645
Bob Litan	DOJ/Antitrust	514-2410	616-2645
David Turetsky	DOJ/Antitrust	307-2032	514-0306

Arati/CiTA



INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE



Per Ray see schedule on pg 5 Need answer by 5/1/95

CC: IS IPCC

To: Prospective members (See attached list)

CC: Prof. B. Bolin
Chairman of the IPCC

From: N. Sundararaman
Secretary of the IPCC

Date: 20 December 1994

Subject: IPCC Drafting Team on the IPCC Study of Article 2
of the UN FCCC - nominations

Total: 5
Pages

Dear Colleague,

1. As you know, the IPCC will write a Synthesis Report (the IPCC Synthesis Report or ISR) based on a review of its Working Groups' Summaries (see IPCC Procedures for Preparation, Review, Acceptance, Approval and Publication of IPCC Reports). The IPCC has also been engaged in examining scientific-technical issues related to achieving the objective (Article 2) of the Climate Change Convention. A workshop on the subject has been held in Fortaleza (17-21 October 1994). The Synthesis Report will include the results of the IPCC examination of Article 2. An underlying report may also be prepared by the IPCC.

2. The ISR has to be drafted, reviewed, revised and approved line by line by the IPCC. It will undergo review sequentially by selected experts and by governments before submission to IPCC for approval. The approval will take place at the eleventh session scheduled for Italy (exact venue to be specified) on 11-15 December 1995. A Drafting Team will be formed under the chairmanship of Prof. Bolin to draft the ISR and to prepare any underlying report. The underlying report will not undergo approval.

3. The IPCC Chairman, the Co-Chairs of the Working Groups viz., Sir John Houghton, Drs. Meira Filho, Watson, Zinyowera, Bruce and Hoesung Lee, the Leaders of the 3 Technical Support Units viz., Drs. Callander, Moss and Haites and the IPCC Secretary will form the core of the Drafting Team. The core team is responsible for the completion and the approval of the ISR.

4. The philosophy of selecting the other members of the Drafting Team has been to achieve, as far as practicable, a balance both geographically and in points of view and to invite persons of international eminence who are very active in relevant subject areas including policymaking.

5. The core team invites you to be a member of the Drafting Team. If you agree, you will have to attend a meeting in Athens from 1 to 4 May 1995 (the IPCC Trust Fund will support the travel of the members from the developing and transitional economy countries). The schedule is tentative with regard to 4 May. A proposed schedule for the completion of the Synthesis Report is attached.

6. Can I have your response as to your willingness to serve on the Drafting Team as soon as possible but no later than 9 January 1995?

Many thanks and regards. Happy Holidays.

Yours sincerely,



N. Sundararaman

Proposed Time Table for the completion of the
IPCC synthesis report

All dates are in 1995

Activity	Deadline
First draft to be ready	April 10
First Meeting of the Drafting Team, Athens	May 1-3 (possible stay over for some on May 4)
Result: Second draft for review by selected experts	
Selection of experts for this review	
Second draft mailed for review by selected experts	May 8
Time for return of reviews: 4 weeks	
Experts' Reviews due	June 6
Reviews collated and sent to Drafting Team	June 26
Second Meeting of the Drafting Team, London	July 3-5
Result: Third draft for governments' review	
Dispatch of third draft for government review	July 10
Time for return of reviews: 8 weeks (required: 6 weeks)	
Reviews received from governments	September 4
Reviews collated and sent to Drafting Team	September 20
Third Meeting of the Drafting Team, Washington D.C.	September 27-29
Result: Final draft for approval at IPCC-XI	
Dispatch of the final draft to governments: 6 weeks (required: a month)	October 30
Approval of final draft, IPCC-XI, Italy	December 11-15

Prospective members:

J. Stiglitz	USA	Lead Author, Chapter I, WG III
M. Parry	UK	Convening Lead Author, IPCC Guidelines for Assessing Climate Change Impacts and Adaptations
J. Melillo	USA	Lead Author, WG I/WG II
J. Goldemberg	Brazil	Convening Lead Author, Chapter I, WG III
Martha Perdomo	Venezuela	Co-Chair, Subgroup D/WG II
Tariq Banuri	Pakistan	Lead Author, WG III on equity & social considerations
Zhou Dadi	China	Lead Author, Chapter on emission scenarios, WG III
R. Odingo	Kenya	Co-Vice-Chair, WG III
Roberto Acosta Moreno	Cuba	Lead Author, Energy Supply Mitigation Options, WG II
Penny Wensley	Australia	Ambassador for environment and to UN in Geneva, Vice-Chairman of INC/FCCC
I. Mintzer	USA	Lead Author, WG III
M. Jefferson	UK	Lead Author on energy supply mitigation options (WG II), World Energy Council
B. Gardner	USA	Represents US industry, such groups as Climate Council

J.-C. Hourcade	France	Economist, lead author on the costs of mitigation (WG III)
TBD	TBD	Impacts expertise preferably water, nomination awaited from Bob Watson

Please note that the WMO, and hence the IPCC Secretariat,
will remain closed from 24 December 1994 to 2 January 1995,
reopening on 3 January 1995.

N II

MEMO

TO: Greg Simon
FROM: Larry Irving
DATE: January 25, 1995
RE: Funding for the Corporation for Public Broadcasting

Congressional leaders have recently proposed elimination of federal funding for the Corporation for Public Broadcasting. They have proposed privatizing CPB, stressing that it would continue to exist without federal support. Recently, Senator Pressler has linked his opposition to federal funding to mismanagement of the system (WSJ 1/24/95). The privatization of CPB would essentially turn PBS and NPR into commercial networks. Individual stations now owned and operated as non-profit organizations could be sold to private corporations which could then operate the stations as PBS affiliates, independent stations or affiliates of other commercial networks. These stations would answer to shareholders rather than to the public or the government.

BACKGROUND

One of the fundamental premises behind such a proposal is that cable television now provides programming that is very similar to programming on public television. Proponents argue that cable television now fulfills the public needs that led to the creation of public broadcasting and thus public television is no longer necessary. The debate focuses on television, since cable radio services are relatively limited in the programming they offer and are not yet widely available.

The set aside of spectrum for public broadcasters was designed to provide an outlet for programming that could not attract advertising dollars -- programming that might not have a market. Because the public owns the airwaves, such a set aside was possible. The question is, does the existence of private delivery systems such as cable television, and soon other pay-for-service video options, obviate the need for part of the spectrum to be set aside for public broadcasting?

Approximately 40 percent of Americans do not subscribe to cable television either by choice, because they can not afford it, or because it is not available in their community. Cable has not reached many rural areas where the population density makes it uneconomical. In addition, many cable systems have only 12 or 24 channels, which limits the number of options they have for alternative programming. If public television were privatized, there is no guarantee that the level of service would be maintained, particularly to rural or remote areas of the country that have difficulty sustaining multiple commercial stations and are less likely to have cable.

Commercialized or privatized public television would most likely not provide the same kinds of programs provided by public television. Privatization would create immediate

financial pressure on stations to make their programming more attractive to advertisers. Without an alternative revenue source, such as the monthly fees that cable television is able to charge, privatized public broadcast stations would be entirely dependent on advertising and private contributions. While a private owner might be able to continue to offer traditional PBS programs, it would likely be on a pay basis rather than on a broadcast basis.

Public broadcasting has led the way in developing technologies for access for the disabled to broadcast information, through closed captioning for the blind and video description for the deaf. The commercial sector has not generally been involved in developing these technologies, thus one would not expect that a privatized CPB could continue to make this commitment.

Private corporations have expressed interest in buying PBS as a programming provider and in acquiring individual public broadcast stations and their licenses. It is worth considering the value of the public broadcast spectrum that would be sold to these corporations, including the additional 6 megahertz for High Definition Television in the next few years. Would the owner of the station license (such as a university or a state government) be able to keep the proceeds of the sale, or would the general public or the general treasury be compensated in some manner?

Finally, public broadcasting stations serve as the anchors for other educational and community activities. PBS Online uses satellite and wired networks to deliver lesson plans, course materials and video segments to schools in 20 states. This serves as a critical link in distance learning programs. Mathline is a video, data and voice communications system designed to improve students' math achievement. Ready to Learn provides programming targeted to preschool children and will be available to day care centers and other care providers. National Public Radio uses computer networks and bulletin boards to distribute in-depth news and information to schools and libraries. All of these services depend on federal seed money through CPB.

OPTIONS

1. **Continue funding CPB at the current level of \$286 million and \$10 million for the PTFP, and propose reforms in management.**

The Administration has supported level funding for CPB since taking office. This has resulted in steady funding for CPB although its funds have declined in real dollars. Funding for the hardware necessary for broadcasting through PTFP has declined in recent years.

Require stricter management by CPB such as requiring those programs that produce significant ancillary revenues to pay back not only their original grant but also a percentage of such revenues. The number of stations with overlapping signals could be reduced. This would lower costs and improve efficiency. Some of these points have now been raised by

Pressler. Similarly, stations that do not receive strong support from their communities could be weeded out by establishing minimum requirements for contributions from local donors.

While some changes in the treatment of ancillary revenues are appropriate, it should be noted that too much of an emphasis on ancillary revenues runs the risk of creating a situation where programming decisions increasingly are based on commercial considerations.

2. Reduce the federal appropriation for the CPB by some percentage.

This should be tied to some specific reforms that are to be accomplished through the reduction in financing such as those proposed above. While Congressional leaders have called for total elimination, there may be room for compromise based on recent comments that positions "are not set in concrete."

3. Target federal appropriations to children's programming and support for rural stations.

Many of the larger, more successful public stations are less dependent on federal funding. On the other hand, these are also the stations that produce most of the national programming that is carried by smaller, rural stations. While such stations could continue operating with reduced federal support, it is unclear what impact this would have on their ability to create programming. Small and rural stations are more dependent on the PTFP which has faced reductions in recent budgets, and will be reduced from \$29 million to \$10 million in the rescission package.

An even more restrictive alternative would be to eliminate federal support for CPB entirely and target all federal appropriations to grant programs such as the NTIA's PTFP and children's programming (NECET) efforts.

4. Establish a spectrum fee for commercial broadcasters to support public broadcasting.

Require commercial broadcasters to pay a fee based on their gross annual revenues to fund CPB, and at the same time relieve them of their public service obligations including children's television and public affairs programming. This has been proposed by Henry Geller and supported by people like Peggy Charren of Action for Children's Television. Given the current move toward spectrum fees this proposal has appeal. This was one of the original proposals for supporting public television. It is opposed by commercial broadcasters which was the reason it was rejected when first proposed.

The advantage of this option is that it would free public broadcasting somewhat from the annual appropriations process. It might be possible to begin with a fee for children's television and then move to a broader fee. Commercial broadcasters would probably oppose since this takes them one more step toward having to pay for their spectrum.

Under its Notice of Inquiry on the Children's Television Act, the FCC is considering a system whereby commercial stations could meet their obligations under the CTA by paying another station in their market (such as a PBS station) to carry educational children's programs. This would have to be accompanied by a requirement that each station provide some minimum amount of educational television each week.

5. **Encourage commercial broadcasters to voluntarily fund CPB much as cable operators contribute to the cost of CSPAN.**

The problem with this proposal is that cable operators are able to collect monthly payments from subscribers for CSPAN as one of their regulated cable channels, while commercial broadcasters would not be able to do the same with public television -- they would therefore have far less of a reason to provide support voluntarily.

6. **Appropriate a one-time endowment for the CPB and end annual federal support.**

Such an endowment could be modeled on public-private foundations that received start-up money but no continuing appropriations. There does not appear to be much chance of any significant one-time grant for such an endowment given budgetary pressures.

7. **Sell the public broadcasting system to the private sector.**

Bell Atlantic floated a proposal to buy the public broadcasting stations in its service area and perhaps to acquire PBS as a programming entity by buying the rights to all or some of its programs. If Bell Atlantic or Jones Intercable or any other corporation buys public broadcasting stations and programming, they could offer these programs on a fee basis, such as through Mind Extension University. Or they could offer them on a broadcast basis supported by advertising. The need to carry commercials will create the same dynamic that exists with commercial stations, and would probably change the kinds of programming carried to more closely resemble commercial stations' offerings.

RECOMMENDATION

I strongly recommend that the Administration support current level funding for the Corporation for Public Broadcasting or a limited percentage reduction, combined with management changes. The Administration should use this opportunity to highlight the difference between Democrats and Republicans when it comes to the public interest and corporate profits. President Clinton is committed to education for all American children, and to job retraining to meet the challenges of the next century. Public broadcasting is an inexpensive and effective part of this program, serving as an anchor for other educational services.

The Administration should support measures to tighten up the financial management of CPB either through legislation or voluntarily by the CPB Board of Directors (WP)

1/25/95). For example, station overlap is an issue that could be addressed in legislation. Programs that generate significant ancillary revenues should pay back more into the system. Funding might be more directly targeted at children's programs, educational programs, and support for rural stations.

Television is our most powerful communications medium. Nothing else comes close. There must be a commitment to using this medium not only for entertainment but for learning and as an information and communications tool for the underserved communities in this country. It is one of the few services that is provided free to all regardless of income.

STRATEGY

Any strategy should be conducted in conjunction with the CPB. If, for example, they are going to work with appropriators on a rescission of current funds, this should be taken into account. Depending on what level of rescission is suggested for other items, it might be the best that CPB can hope for is to take the same percentage reduction.

The public strategy of the Administration should strongly support the idea of public broadcasting and its continued importance as well as continued level funding. This should include speeches, opinion pieces, press statements and appearances on news programs.

One of the strongest arguments in favor of continued federal funding for public television is the amount of educational children's programming on PBS every day. PBS provides approximately 6 hours a day of educational children's programming. Commercial television provides about 8 hours of educational children's programming for all networks combined per week. Virtually all of this programming is aired on weekends, and is often preempted by sporting events. The television is on an average of seven hours a day in most American homes. Without PBS, non-cable families with young children have no place to turn for quality children's shows. With approximately 70 million children in America, between 25 and 35 million are in non-cable households.

The strategy could also include a letter to leaders in Congress outlining the importance of public broadcasting in terms of children's programming, on-line computer services for children, access for the disabled, and pointing out the diversity of the public broadcasting audience. Groups to meet with to discuss strategy and support for CPB include children's television advocates, disabled groups, teachers, day care providers, state and local governments, universities with public stations, and distance learning participants. The Administration should also encourage commercial broadcasters to support continued government-funded public broadcasting.

Jump-starting the Global Information Infrastructure
A Discussion Paper**Background:**

At a speech before International Telecommunications Union in Buenos Aires, Vice President Gore set forth a vision of a "planetary information network that transmits messages and images with the speed of light from the largest city to the smallest village on every continent."

At the recent Naples summit of the G-7 countries, President Clinton was successful in raising the issue of the Global Information Infrastructure. As a result, the heads of state agreed to encourage "the development of an open, competitive, and integrated worldwide information infrastructure." A follow-up meeting will be held at the Ministerial level in Brussels in late February 1995. The U.S. delegation will be led by Secretary of Commerce Ron Brown.

The challenge:

The Clinton-Gore Administration is interested in promoting cooperative activities that will catalyze the development of the GII and its applications.

These cooperative activities should demonstrate exciting GII applications and deploy the infrastructure necessary to support these applications.

These activities should:

- Be based on strong participation from the private sector, to drive home the point that the private sector will build, own, and operate the GII;
- Capture the public's imagination by demonstrating compelling and useful applications to millions of people around the world; and
- Tackle problems that are generally perceived to be barriers and impediments to the development of the GII, and that require international cooperation to solve.

The Administration believes that these activities could help catalyze worldwide demand for new products and services, increase support for national policies that promote the GII (e.g. market-oriented telecommunications policies,

cost-based pricing), and give some concreteness to the GII -- which is still a fuzzy concept to most people.

What are some potential applications?

There are a large number of potential applications. Below are a few examples. Assuming that the appropriate infrastructure is in place, none of these are mutually exclusive.

1. A "World's Fair" for the Information Age:

As proposed by Carl Malamud, President of the Internet Multicasting Service, a World's Fair for the Information Age would expose millions of citizens around the world to the power of new information and communications technology. In the past, world fairs have spurred technological innovation, heightened public awareness of new technologies, and left enduring legacies (e.g. the Eiffel Tower).

Similarly, high-speed links between major cities in North America, Europe, and Japan would allow:

- Permanent exhibitions at museums like the Smithsonian;
- A "Global Town Hall" featuring addresses from public figures; and
- Sharing of resources like planetariums, aquariums, and digital resources for education.

2. A Global Digital Library:

The G-7 would commit themselves to increasing the amount of networked multimedia information in the public domain. These resources could include the catalogues of national libraries and archives, on-line museums, scientific and technical information, and information related to the country's history, geography, culture and language.

The G-7 could also work with international organizations such as the United Nations, the World Health Organization, the Food and Agricultural Organization, multilateral development banks, etc. to make networked information available on agriculture, rural development, international environmental issues, health, economic development, and other topics of international significance.

With private sector participation, this could also be used to support global electronic commerce in copyrighted materials.

3. Electronic commerce:

An electronic commerce testbed would help address issues related to electronic payments, currency convertability, intellectual property rights, authentication, and security.

4. Interoperability:

According to industry sources, deploying new technologies such as Asynchronous Transfer Mode will require further progress on multivendor interoperability in a number of areas, including switch and carrier interworking, adaption layer standards, quality of service definitions, signaling, and application services and APIs.

International testbeds could help industry make progress on promoting and demonstrating global interoperability.

What questions need to be resolved?

By the time the February meeting is held, we will need a consensus in both government and industry in the relevant countries that an initiative like this is worth supporting.

Although it will not be necessary to nail down every last detail to get high-level political support, these questions will eventually need to be answered.

1. What kind of infrastructure needs to be deployed?

Currently, most of the circuits between North America, Europe, and Japan are 1.5 – 2.0 megabits/second, which would not support a full range of multimedia applications.

What kind of infrastructure, both wired and wireless, needs to be deployed to support these applications? How should it connect to the Global Internet?

2. What are the respective roles of the private sector and government?

To what extent is the private sector willing to donate the resources (ideas, people, bandwidth, equipment, etc.) required to make this happen? What steps should the government take to facilitate this initiative?

3. What organizational structure would be required to manage this project?

Some organization is required for overall project management; however, too much bureaucracy could result in the initiative grinding to a halt. One possibility is the establishment of non-profit organizations to coordinate private sector involvement and participation.

4. How can other countries participate?

**NIST**

UNITED STATES DEPARTMENT OF COMMERCE
National Institute of Standards and Technology
Gaithersburg, Maryland 20899
OFFICE OF THE DIRECTOR

Task force - Info. Infrastructure

NOV - 2 1994

MEMORANDUM FOR IITF Members

From: *Arati Prabhakar*
Arati Prabhakar, Chair of Committee on
Applications and Technology

Subject: Transmittal of Applications Highlights Report

On Monday, October 24, 1994, "Highlights of National Information Infrastructure Applications Activities: A Report for the FY 1996 Budget Process" was transmitted to the Office of Management and Budget. A copy of the report and transmittal memo are attached.

Thank you again for your contributions. Through your efforts we have produced a document that will provide a valuable input to the FY 1996 budget process and a framework for a document that will be released with the President's budget to inform the public and Congress of the scope and range of the Administration's NII investments and activities. As we work toward the February release, I look forward to your continued input.

Attachment



THE SECRETARY OF COMMERCE

Washington, D.C. 20230

OCT 24 1994

MEMORANDUM TO Alice Rivlin
Director, Office of Management and Budget

FROM: Ronald H. Brown 
Chair, Information Infrastructure Task Force

SUBJECT: Highlights of National Information Infrastructure Applications
Activities

The enclosed report has been prepared to illustrate Administration actions that will foster the development and deployment of applications of the National Information Infrastructure (NII). This is one of the ways the Administration's Information Infrastructure Task Force (IITF), which I chair, is helping to shape a vision of the NII and to bring that vision closer to reality.

Earlier this year, the Vice President had asked the IITF to highlight NII-related activities as input for the FY 1996 budget process. In this report, we present a description and analysis of eight application areas that are the subject of particular federal attention: digital libraries; education; electronic commerce; environmental monitoring and natural resource management; government services; health care; manufacturing; and transportation.

This information is intended to help guide the FY 1996 budget decision-making process. We ask your help in using this information to increase the profile of NII-related activities in the core programs of all agencies. We believe the *FY 1996 NII Applications Highlights Report* will make a significant contribution to the Administration's NII efforts by focusing attention on programs and initiatives during the FY 1996 budget process.

For Official Use Only

Highlights of National Information Infrastructure Applications Activities

A Report for the FY 1996 Budget Process

**Information Infrastructure Task Force
October 24, 1994**

Contents

Executive Summary	1
Introduction	3
Highlighted NII Initiatives	
Master Spreadsheet.....	7
Digital Libraries	
Overview of Application Area	11
Highlighted Initiatives	12
Spreadsheet	13
Education	
Overview of Application Area	15
Highlighted Initiatives	15
Spreadsheet	19
Electronic Commerce	
Overview of Application Area	23
Highlighted Initiatives	24
Spreadsheet	25
Environmental Monitoring and Natural Resources Management	
Overview of Application Area	27
Highlighted Initiatives	28
Spreadsheet	29
Government Services	
Overview of Application Area	31
Highlighted Initiatives	31
Spreadsheet	33
Health Care	
Overview of Application Area	37
Highlighted Initiatives	38
Spreadsheet	41
Manufacturing	
Overview of Application Area	43
Highlighted Initiatives	44
Spreadsheet	47
Transportation	
Overview of Application Area	49
Highlighted Initiatives	50
Spreadsheet	51

Executive Summary

This package of information has been prepared by the Information Infrastructure Task Force (IITF), the inter-agency team chaired by the Secretary of Commerce, which is implementing the President's action plan for developing, in partnership with the private sector, an advanced information infrastructure, the National Information Infrastructure (NII). Development of the NII has the potential to significantly improve the way people use information in their jobs and other aspects of their daily lives by bringing vast amounts of information and greatly improved services to virtually every citizen.

Private industry will be responsible for virtually every major facet of the NII and the information marketplace it creates. Nevertheless, the government will play an important role in this process by complementing and enhancing the benefits of private sector initiatives. As Vice President Gore has observed, "Our goal is not to design the [information] market of the future. It is to provide the principles that shape the market. And it is to provide the rules governing this difficult transition to an open market for information. We are committed in that transition to protect the availability, affordability and diversity of information and information technology as market forces replace regulations and judicial models that are simply no longer appropriate."

Earlier this year, the Vice President asked the IITF to highlight NII-related activities as input for the FY 1996 budget process. In this first year of such an effort, the IITF has focused on NII applications. This report identifies and illustrates what the Administration is doing to accelerate the development and deployment of NII applications. Since NII applications permeate so much of the government's activities, the IITF has not attempted to catalog the entirety of the government's involvement in the NII. Instead, the IITF has focused on illustrating where the government is committing its resources by describing key initiatives within each of eight application areas. This information is intended to help guide the FY 1996 budget decision-making process.

We have identified new initiatives proposed for inclusion in the FY 1996 Budget, as well as existing programs that are restructuring their efforts in a significant way. The primary goals are to provide a clear and compelling description of key efforts to accelerate NII applications and to increase the profile of NII-related activities in the core programs of all agencies. This report provides an input to the FY 1996 budget process. We hope to publish, at an appropriate time, a document based on this report to inform the public of the scope and range of the Administration's NII investments and efforts.

Introduction

This report, the Highlights of National Information Infrastructure Applications Activities: A Report for the FY 1996 Budget Process, is designed to highlight key initiatives that support the Administration's goals in the development and deployment of applications of the National Information Infrastructure (NII). The report has been prepared by the Administration's Information Infrastructure Task Force (IITF), the inter-agency team coordinating the development and use of the NII across government.

The NII will consist of (1) conduits, interconnected, interoperable telecommunications networks, (2) information appliances including computer systems, televisions, fax machines and telephones (3) software, information services, and information databases (e.g., "digital libraries"), and (4) trained people who can build, maintain, and operate these systems. In the future, the NII will enable all Americans to get the information they need when they need it, where they need it, and at an affordable price. Secretary of Commerce Ronald Brown notes that the NII and the information revolution will result in "a fundamental change in the way we work, the way we learn, and the way we communicate. Knowing how the Industrial Revolution permanently altered American life, we can only begin to imagine how we will be transformed by becoming an information society."

Private industry will build, own, and operate the NII and the information marketplace it creates. Private industry will build and manage the networks, provide the information tools and much of the information that travels the networks, and develop most of the applications that use the networks. But government remains a major influence on the NII and is committed to its development. In his State of the Union Address, President Clinton set as a National goal connection of the Nation's classrooms, libraries, schools, and clinics to the information infrastructure by the year 2000. Government policies on telecommunications reform, universal service, open access, privacy, security, interoperability, and standards, to name a few, will help shape the way the NII develops. Government actions, such as regulatory changes and intellectual property protection can help remove barriers to critical social and commercial applications of the NII. The federal government will use the networks to provide more efficient delivery of information and services to citizens. Another important role for government is coordinating U.S. activities with those of other countries, so that a truly international marketplace for information products and services can develop. As the Vice President has said, the international community is on the way to building a Global Information Infrastructure. Internet pioneer Robert Kahn believes that "Without government involvement on an international basis, it is unlikely that a global information infrastructure will emerge" [R.E. Kahn, CACM, Vol. 37, Nr. 8 (Aug 1994)].

The White House formed the IITF to articulate and implement the Administration's vision for the NII. The task force consists of high-level representatives of the federal agencies that play a major role in the development and application of information and telecommunications technologies. Working together with the private sector, the participating agencies are developing comprehensive technology, telecommunications, and information policies and promoting applications that best meet the needs of both the agencies and the country. Agencies are sharing information on NII-related activities, making it possible to leverage each other's work and avoid overlaps in activities. By helping build consensus on difficult policy issues, the IITF enables agencies to make and implement policy more quickly and effectively.

The IITF's Committee on Applications and Technology (CAT), chaired by Arati Prabhakar, Director of the National Institute of Standards and Technology, coordinates the Administration's efforts to develop, demonstrate, and promote applications of information technology in manufacturing, education, health care, government services, libraries, environmental monitoring, electronic commerce, and other applications. To determine tasks and priorities, the CAT draws on a wealth of input and comments from the private sector. Individuals, companies, and professional societies commented on issues papers and two reports on application areas. These reports, "Putting the Information Infrastructure to Work" and "The Information Infrastructure: Reaching Society's Goals", can be consulted for more information on the application areas discussed in this document. These reports are available through the IITF Secretariat. In addition, a partnership between industry and government resulted in a highly successful conference in September 1994: "Breaking the Barriers to the National Information Infrastructure." Nearly all the products from these activities are available to the public electronically through the Internet, providing a demonstration of the way government publications can be delivered using the NII.

Earlier this year, the Vice President asked the IITF to highlight NII-related activities that would increase the profile of federal NII-related efforts and assist Administration policy makers in determining where federal spending is being used on NII-related application areas. On June 24, 1994, Ronald Brown, Secretary of Commerce and Chair of the IITF, and Leon Panetta, then Director of the Office of Management and Budget, directed the IITF's Committee on Applications and Technology to identify new and existing federal initiatives that are significant to the NII. To accomplish this task, the CAT drew on the broad-based participation of people from across the government. In July, the CAT identified eight NII applications as categories into which agency submissions would be organized. The eight application areas are digital libraries; education; electronic commerce; environmental monitoring and natural resources management; government services; health care; manufacturing; and transportation. The CAT chose these as the core set of applications because there are significant public interests to be served by the application of advanced information and communication technologies in these areas.

From the end of July through October, a team of CAT participants from several federal agencies reviewed information from 20 agencies on more than 350 initiatives and 28 inter-agency programs and developed a framework for highlighting the Administration's NII-related efforts.

In addition to these contributions, we have also received preliminary input from the National Science and Technology Council (NSTC) Research and Development Budget Cross-cut. Agencies' NII-related programs and initiatives that have been submitted for the NSTC R&D Budget Cross-cut are noted in each of the eight application areas. Within the NSTC, the High Performance Computing and Communications (HPCC) Program has an important role in the development of the NII. The newest element of the HPCC Program, the Information Infrastructure Technology and Applications component, builds on and expands the research goals of the existing HPCC components and will provide critical enabling technologies that support each of the eight application areas. For a more detailed representation of agencies' HPCC efforts, please refer to the HPCC FY 1996 Budget Notebook.

The culmination of this effort is represented in this report, which was reviewed by the IITF at its meeting on October 4, 1994. Each of the eight applications areas provides a summary description of existing federal efforts and specific information to highlight key initiatives. The report also contains a spreadsheet that organizes all agency submissions into categories that reflect important issues or objectives for that application. Recognizing that a number of programs have contributions that span across application areas, the report lists programs and initiatives in each of the application areas where they have relevance.

Highlighted NII Initiatives

<i>Application Areas</i>
Digital Libraries
Comprehensive Digital Library Initiatives (NASA, NSF, Library of Congress)
New Technologies (DoC/NIST, DoE, NASA, NARA, NSF)
Seamless Electronic Information Location and Access (DoC/Census, DoD/DISA, DoE, DoI/FGDC, DoJ, DoL, NASA, NSF, SBA)
Library Infrastructure Grants (USDA/RDA, DoC/NTIA, Ed)
Education
Federal Leadership Activities (DoC/NOAA, EPA, NASA, NSF, and other agencies)
Planning (Ed)
Research and Development, Including Demonstrations (Ed, NASA, NEH, NSF)
Deployment of Technology (USDA, USDA/RDA, USDA/REA, DoC/NTIA, Ed, DoL/OSHA, NEH)
Professional Development (Ed, NASA, NEH)
Electronic Commerce
Development of Technology (DoC/NIST, DoE)
Development of Standards (DoD/DISA, NASA)
Development of Architectures (DoC/NIST, DoD/DISA, DoE, Treasury, GSA, SBA, VA)
Development of Applications/Demonstrations (USDA, DoC/NIST, DoD/DISA, DoE, HUD, DHHS, DoL, Treasury, EPA, NASA, NSF, SBA, TVA, VA)
Environmental Monitoring and Natural Resources Management
Research and Modelling Programs (USDA/Forest Service, DoC/NOAA, DoE, EPA, NASA)
Information Access/Connectivity (USDA/Forest Service, DoC/NOAA, DoE, DoI/NBS, EPA, NASA, NSF, and other agencies)
Data Standards and Interoperability (USDA, USDA/Forest Service, DoI/FGDC, EPA)

Table continues on next page.

Highlighted NII Initiatives (cont'd)

<i>Application Areas</i>
Government Services
Information Access Projects (USDA, DoC, Ed, DHHS, DoI, DoJ, DoL, EPA, GSA, NASA, NEH, SBA, & other agencies)
National Performance Review Projects (USDA, DoC, DoD, DoE, DoJ, DHHS, DoL, Treasury, EPA, GSA, NARA, NEH, SBA, USPS, VA, & other agencies)
Service Delivery Projects (USDA, DHHS, HUD, DoI, DoL, NARA, VA, and other agencies)
Information Infrastructure Development (USDA, DoC, DoD, DoE, DHHS, HUD, DoI, DoJ, DoL, GSA, NASA, NARA, NEH, NSF, SBA, & other agencies)
Health Care
Health Care Access Programs (USDA/RDA, USDA/REA, DHHS/HCFA, DHHS/NIH, DHHS/ORH, DHHS/PHS, NASA, VA)
Health Care Quality Programs (USDA/REA; DoE; DHHS; AHCPR, CDC, CRDL, HCFA, HSTAR, NHIC, NLM, ODPHP, SAMSHA, SSA; DoL; NASA; VA)
Health Care Cost Containment Programs (DHHS/HCFA)
Infrastructure Investments Specific to Health (DoC/NIST, DoC/NTIA, DHHS/NLM, NASA)
Manufacturing
Research and Development (DoC/NIST, DoE, NSF)
Deployment (USDA/RDA, DoC/NIST, DoE, NASA, TVA)
Education and Training (DoE)
Transportation
Intelligent Vehicle-Highway Systems IVHS (DoT/FHWA, DoT/FTA, DoT/NHTSA)
Spatial Data and Reference Infrastructure (DoC/NOAA, DoT/FAA, NASA)
Mesoscale Aviation Weather Systems (DoC/NOAA, DoT/FAA)
Air Traffic Management and Control (DoD, DoT/FAA, NASA)
Waterway Management & Vessel Traffic Systems (DoC/NOAA, DoD/ACE, DoT/MARAD, DoT/USCG)

I. Digital Libraries -- Overview of Application Area

A "digital library" is a collection of electronically accessible records and recordings on various storage media, consisting of text, video, images, numerical tables, data observations, software, audio and image sequences (narrated films) for access, retrieval, browsing, query and display. Digital library technology supports the vision of linking of these resources and making them available to the citizen from their home, office or mobile environment through the National Information Infrastructure (NII). The ability of digital libraries to store and share knowledge, history and culture will be central to the success of the NII.

Digital libraries will provide access to an improved flow of electronic government information and world-wide digitized resources, and provide long-term access to the records and expressions of culture and scholarship. They will help to ensure that information is accessible to all and prevent the formation of a society divided into information haves and "have-nots." Most importantly, digital libraries promise to revolutionize our education methodology, and allow all elements of our society the ability to assimilate information according to one's own associative interest and curiosity.

Existing barriers to achieving the digital library vision fall into the areas of technology; policy and standards; and education. Technology is required to store, locate, browse, retrieve and distribute digital library information. Conversion technology is needed to digitize text and images which currently exist in a non-digital format. Standards and policy are needed to ensure that consistent strategies can be deployed when utilizing digital libraries. Training on how to use digital libraries on the NII and on how to incorporate these resources into the home and workplace to improve our quality of life and standard of living will be key to attaining the vision.

Digital library initiatives will help breakdown the technological barriers to achieving the digital library vision. These initiatives are taking place in agencies across the government. The National Aeronautics and Space Administration (NASA), the National Science Foundation (NSF) and the Library of Congress have established comprehensive digital library programs that are structured to meet the goals of the NII. Many of these and other federal efforts are public/private partnerships and involve substantial private sector investment. Other federal agencies have targeted the development of specific technologies relevant to digital libraries. For example, the National Institute of Standards and Technology (NIST) is developing a spoken natural language interface to libraries. Digital library efforts to provide seamless electronic location of and access to existing sources of federal information are the most prevalent. The Department of Energy (DoE) and NASA efforts to make their scientific and technical information available in digital format are representative of this type of effort. Financial assistance to help today's libraries acquire the infrastructure necessary to embrace digital technologies is another area of federal investment which is key to the development of digital libraries. The Department of Education's interlibrary collaboration grants is one model of this type of activity.

Within the digital libraries application, investment gaps were noted in the areas of training programs, standards and intellectual property rights, and digitization of text and images. Future investment in these areas is critical to realizing the digital library vision.

II. Digital Libraries – Highlighted Initiatives

Federal digital library initiatives can be grouped into the following categories:

(1) Comprehensive Digital Library Initiatives. Both NASA and NSF established comprehensive, multi-year digital library initiatives during FY 1994 which are specifically targeted at achieving the NII goals for government action. These initiatives encourage private sector participation and cost sharing in programs to promote technological innovation and new applications with regard to digital libraries on the NII. The NASA effort makes available a treasure of environmental and space science images by encouraging the access of remote sensing data products over the Internet and the projects involve broadcast TV, cable TV, industry, academia, K-12 schools, and museums. Areas of investigation address universal service and access, education, user interfaces, and intelligent searches. In addition, the NASA project reaches out to a much broader audience than ever addressed before on a regular basis (potentially millions of people over major TV networks nightly). The project also encourages the creation of new job opportunities and new industrial opportunities by bringing high-speed (ethernet capability) into homes and schools over standard cable TV channels at reasonable costs.

(2) New Technologies and Information Products. A number of agencies have focused on developing specific technologies related to digital libraries to further the goals of the NII. NIST is sponsoring research on a spoken natural language interface to digital libraries. The Department of Energy is developing digital library tools in their Digital SuperLab. The DoE Computer Incident Advisory Capability addresses information security issues, while their National Storage Lab seeks out new techniques for handling the massive storage requirements which are inherent in the NII vision. The DoD Intelligent Archive and the NASA Access Mechanism are technology projects seeking to advance the use of intelligent interfaces and agents for information retrieval.

(3) Seamless Electronic Information Location and Access. Digital library efforts to provide seamless electronic location of and access to existing sources of federal information are the most prevalent digital library applications currently being funded. These projects promote seamless, interactive access to government and other information. Initiatives in this area are addressing scientific and technical information, software, business/economic data, and humanities information. These projects will result in the enrichment and expansion of the knowledge base available via the NII.

(4) Library Infrastructure Grants. The role of libraries in the future will be to advocate and help provide information equity and universal access for the public. Libraries will continue to coordinate and facilitate preservation of records and expressions of the nation's intellectual and cultural life both in traditional and digital formats. Many libraries need financial assistance to help them acquire the infrastructure necessary to embrace digital technologies. The Department of Education's LSCA Title III Interlibrary Collaboration Grants, the Department of Agriculture's Community Facility Loans, and the Department of Commerce's Telecommunications and Information Infrastructure Assistance Program provide assistance of this type.

Digital Libraries

Agency Contributions

Comprehensive Digital Library Initiatives

*Digital Library Project (NSF)

**Digital Library Projects (NASA, Library of Congress)

New Technologies

*Spoken language interface to libraries (DoC/NIST)

Computer Incident Advisory Capability (DoE)

Digital SuperLab (DoE)

Electronic Exchange of Full-text Documents (DoE)

Intelligent Archive (DoE)

National Storage Lab (DoE)

NASA Access Mechanism (NASA)

Archival Electronic Records Inspection and Control (AERIC) & Archival Preservation System (APS) (NARA)

Interactive Systems Program (NSF)

Seamless Electronic Information Location and Access

Scientific and Technical Information

Internet/NII Information Search Tools (DoE)

Information Locator Prototype (DoE)

Digital Library for Energy and the Environment (DoE)

Scientific Information Dissemination Project (DoE)

National Spatial Data Infrastructure - NSDI (DoI/FGDC)

Combined DNA Index System (CODIS) (DoJ)

Computerized Information System (OCIS) (DoL)

NASA STI Program Infrastructure Upgrade (NASA)

National Technology Transfer Center (NASA)

Software

DISA Repository Systems (DoD/DISA)

NetLIB (DoE, NSF)

Repository-based Software Engineering Program (NASA)

Mosaic (NSF)

SBA Software Clearinghouse (SBA)

Business/Economic

STAT-USA Data Dissemination (DoC/Census)

Humanities

Collaborative Projects Program (NEH)

Digital Information Evaluation (NEH)

Virtual Library Models (NEH)

Prototype Distribution of Cultural Materials through the NII (NEH)

Editions Program (NEH)

Archaeology Program (NEH)

Reference Materials Program (NEH)

Library Infrastructure Grants

Telecommunications and Information Infrastructure Assistance Program (TIAP) grants (DoC/NTIA)

Community Facility Loans (USDA/RDA)

LSCA Title III Interlibrary Collaboration Grants (Ed)

* Indicates initiative has been identified by the NSTC R&D Budget Cross-cut

**Although not formally part of the Administration's Budget Process, the Library of Congress wished to include this project for the report.

I. Education -- Overview of Application Area

The National Information Infrastructure (NII) promises every business, government agency, hospital, home, library, and school in the nation access anywhere, anytime to voice, data, full-motion video, and multimedia applications. The NII will be capable of interweaving schools, homes, and workplaces and reintegrating learning into the community fabric. The impact of these capabilities on learning -- for children, advanced students, and lifelong learners -- will be substantial. When fully realized and available equitably in all learning sites, these technologies will support the transformation of education into an active, hands-on process that engages the minds and imaginations of all learners and fosters the promise of lifelong learning.

Through the use of these technologies and a national commitment to quality education, students of all ages and abilities will reach the highest standards of academic achievement. Students will be able to access multimedia electronic libraries and museums containing text, images, video, music, simulations, and instructional software. Teachers, engineers, business managers, and all knowledge workers will have available new methods of working and learning, and will collaborate and share ideas with one another.

Despite the promise of NII-related technologies to improve learning, the pace of technology adoption in education over the last decade has been slow. To address this, President Clinton has set as a National goal connection of the Nation's classrooms, libraries, schools, and clinics to the information infrastructure by the year 2000. Continued government leadership and investments in NII-related efforts will provide support for these important initiatives and stimulate private sector investments in the arena of learning technologies.

Significant gaps in the federal government's investments exist in support for planning; research, development, and demonstration; technical assistance; and professional development. For planning, technical assistance, and professional development, more resources could effectively be used under existing authorities. In research, development, and demonstration, the most immediate need is for a more coherent and focused federal investment. However, it must be noted that the bulk of investments needed to bring about the NII must come from state and local governments, which together provide 93% of K-12 education funds and the majority of support for education at other levels. As reflected in the Department of Education's Goals 2000 program, close cooperation between federal, state and local education agencies will therefore be essential to the timely development of important educational applications.

II. Education -- Highlighted Initiatives

The federal government's current efforts that support the development of the NII for lifelong learning span at least six different agencies. For the purposes of this exercise, the federal government's efforts can be organized into five categories: federal leadership activities; planning; research and development; deployment; and professional development.

II. Education -- Highlighted Initiatives (Continued)

(1) **Federal Leadership Activities.** The Clinton Administration has made technology for education a policy priority. In his State of the Union Address, President Clinton set as a National goal connection of the Nation's classrooms, libraries, schools, and clinics to the information infrastructure by the year 2000. Both the Department of Education and the White House Office of Science and Technology Policy have focused new resources on providing leadership to the nation in this area. Components of this effort include the development of a long-range plan for technology in education, to be completed in FY 1995; conferences drawing together educators, private sector leaders, regulators, and others; development of better statistical information about current uses of telecommunications in K-12 schools; support for legislative and regulatory changes; and other activities.

(2) **Planning.** The Clinton Administration's K-12 education policy will provide support for state and local systemic education reform. New legislation will also provide support for states and communities to focus all activities on the achievement of high standards by learners. Highlighted programs in this category include:

- ***Goals 2000: Educate America Act (Ed).*** This program represents the Administration's framework for education reform and is designed to provide resources to states and communities to develop and implement comprehensive education reforms that help all students reach high academic and occupational skill standards. In FY 1994, it provided grants for the integration of technology and information infrastructure into state education improvement plans. Grants in FY 1995 and successive years will support the implementation of state plans and the development of local plans.

(3) **Research and Development.** At least five federal agencies engage in research, development and demonstrations. Under this rubric are activities such as research on educational outcomes facilitated by technology; the development and testing of new software and applications; the development of network models in educational settings; and support for pilot projects that provide visible examples of success and failure and critical experience and evaluation data. Highlighted programs in this category include:

- ***Challenge Grants (Ed).*** The Department of Education will support grants to consortia that include school districts in high-poverty areas and other entities such as private sector firms, universities, and museums to develop technology-supported learning opportunities.
- ***Network Infrastructure for Education Program (NSF).*** As part of the National Science Foundation's Education and Training contribution to the High Performance Computing and Communications (HPCC) Program, this initiative provides grants to alliances of academic institutions, school districts, professional societies, state agencies, and others concerned with education reform to complete policy studies and research, development and demonstration projects related to the role of electronic networks in support of reform education.

II. Education -- Highlighted Initiatives (Continued)

(4) Deployment of Technology. Programs in the Department of Commerce and the Department of Education support the deployment of communications and information technologies into learning settings. Highlighted programs in this category include:

- ***Title I (Ed).*** Title I of the Elementary and Secondary Education Act, previously known as Chapter 1, is the largest federal education program, providing support for services to help over 6 million poor children and children in high-poverty areas learn to high standards in over 53,000 schools. Funds are distributed by formula according to student population and poverty statistics, and spending decisions are made at the school district level. A significant fraction of Title I dollars (approximately 15%) will support the acquisition of computers, software, and networking equipment to support instruction and administration.
- ***Telecommunications and Information Infrastructure Assistance Program (TIIAP) (DoC/NTIA).*** This program provides matching grants to non-profit entities, including schools and universities to help them access new telecommunications and information technologies. In FY 1994, 22 grants were awarded for education applications.

(5) Professional Development. The development of skills among the nation's educators -- including teachers, administrators, and instructors of all kinds -- is a major bottleneck for the development of the NII. New technology tools must become familiar to and accepted by the nation's educators. Professional development is costly and time-consuming; it takes as many as two years of experience with new equipment for teachers and instructors to become fluent users of new technology tools. Highlighted programs in this category include:

- ***Eisenhower Professional Development Program (Ed).*** This program will provide grants to states, school districts, and institutions of higher education to provide access to professional development that support state and local systemic reform efforts. It is anticipated that a significant share of these funds will support training related to instructional technology, networking, and distance learning.
- ***Regional Educational Technology Support and Professional Development Consortia (Ed).*** The Department of Education will support a system of regional educational technology support and professional development consortia, which assists states, school districts, and schools in the use of technology, including networks, and will provide professional development opportunities for educators.

Education

Agency Contributions

Federal Leadership Activities

Global Learning and Observation to Benefit the Environment (DoC/NOAA, NASA, NSF, EPA, and other agencies)

Planning

*Goals 2000: Educate America Act (Ed)

Regional Education Laboratories (Ed)

Research and Development, Including Demonstrations

Basic Research and Dissemination Authority -- Regional Education Labs (Ed)

Challenge Grants (Ed)

Dept. of Education Research Activities (Ed)

Fund for Improvement of Post Secondary Education (Ed)

Fund for Innovation in Education -- Computer-based Instruction and Teacher Networking Grants (Ed)

*National Institute on Disability and Rehabilitation Research (Ed)

Special Education -- Technology Applications (Ed)

Technology, Educational Media, and Materials Program (Ed)

*K-12 Education Project (NASA, NSF)

Funds for Interactive Learning Centers (NEH)

Funds for Collaborative Projects Linking Institutions (NEH)

Leadership Opportunity in Science and Humanities Education (NEH)

Special Opportunities in Foreign Language Education Grants (NEH)

*Education & Human Resources (MOSIS, Superquest, Networking Infrastructure for Education, etc.) (NSF)

Deployment of Technology

Distance and Community Learning from the Cooperative Extension Service (USDA)

Community Facility Loans (USDA/RDA)

Distance Learning-Medical Link Grant Program (USDA/REA)

Distance Learning-Medical Link Loan Program (USDA/REA)

Technical Assistance Program (USDA/REA)

Telecommunications and Information Infrastructure Assistance Program (TIIAP) grants (DoC/NTIA)

New Elementary and Secondary Education Act Initiatives -- Consolidated ESEA Technical Assistance Centers (Ed)

Special Education Grants (Ed)

Star Schools (Ed)

*Technology-related Assistance for Individuals with Disabilities (Ed)

Title I (Ed)

OSHA Employee and Employer Education and Training (DoL/OSHA)

Equipment for Multimedia Exhibits (NEH)

Nebraska Plan to Link Rural-Urban Resources (NEH)

* Indicates initiative has been identified by the NSTC R&D Budget Cross-cut

Table continues on next page.

Education (cont'd)**Agency Contributions****Professional Development**

*AskERIC Service (Ed)

Eisenhower Professional Development Program (Ed)

Gopher-FTP-WWW site (Ed)

Regional Educational Technology Support and Professional Development Consortia (Ed)

Spacelink (NASA)

Division of Education Programs (NEH)

Expanded Exemplary Award Program (NEH)

Funds for Professional Development (NEH)

Division of Fellowship and Seminars (NEH)

Teaching with Technology Initiative (NEH)

* Indicates initiative has been identified by the NSTC R&D Budget Cross-cut

I. Electronic Commerce -- Overview of Application Area

The vision of electronic commerce is to enable U.S. companies to increase productivity and adaptability to changing markets. Electronic commerce will provide an integrated collection of low-cost, reliable services to handle tremendous volumes of business and technical transactions and to amass, analyze, and control large quantities of data. Organizations will be able to improve efficiency and accuracy, and reduce costs, while providing faster, more reliable, and more convenient services. U.S. companies will be able to reengineer their business processes, and then use the National Information Infrastructure (NII) to realize the productivity potential of their current and future information technology investments. Smaller firms will be able to enter and participate at lower cost and with greater efficiency in new markets, and larger firms will be able to evaluate, select, and more readily work with other companies. New ways of doing business and new forms of economic activities will become commonplace, including telecommuting, global sourcing arrangements, new training and education capabilities, and disaggregated alliances or networks of companies.

Electronic commerce will provide the services to achieve this vision by integrating communications, data management, and security services to allow business applications within different organizations to automatically interchange information. Communications services transfer the information from the originator to the recipient, according to formats defined by the data management services. Security services authenticate the source of information, verify the integrity of the information received by the recipient, prevent disclosure of the information to unauthorized users, and verify that the information was received by the intended recipient. Electronic commerce applies and integrates these infrastructure services to support business applications such as electronic bidding, ordering and payments, and exchange of digital product specifications and design data.

Many companies and government agencies use electronic commerce to facilitate internal operations and interact seamlessly with their trading partners, but they usually require highly structured, previously established agreements on communications, data formats, and security. The resulting costs and lead times create economic barriers to widespread use of electronic commerce applications by small- and medium-sized companies. Other barriers to electronic commerce include real or potential problems with scalability, interoperability, and ease of use. Developing and implementing electronic commerce is a top priority throughout the federal government, but many public and private investments are concentrated on short-range payoff. There is insufficient long-range investment in the standards and technologies needed by industry to develop the next generation of electronic commerce. For example, collaborative engineering and agile manufacturing may require sharing high volumes of very complex data. High-speed communications, transaction management, and the management of many interrelated versions of data are needed to support these requirements and to seamlessly integrate research, design, engineering, production, marketing, and sales.

II. Electronic Commerce -- Highlighted Initiatives

The electronic commerce spreadsheet is divided into the following sub-categories:

(1) Development of Technologies. Initiatives in this category focus on developing, improving, and integrating communications, data management and security services. These critical services are required to access, to manage and to ensure the security of information resources.

(2) Development of Standards. Initiatives in this category focus on developing standards for both the supporting technologies and the content and structure of electronic commerce transactions. The former standards will be needed to ensure the interoperability of electronic commerce software and hardware produced by different vendors. The latter standards will ensure that the recipient of the information is able to understand the structure and meaning of that information.

(3) Development of Architectures. Initiatives in this category focus on interacting and combining standards and technologies to form complete electronic commerce systems. An important element of the development of new architectures is the Administration's Federal Electronic Commerce Acquisition Team (FECAT). FECAT is defining the Electronic Commerce architecture called for in the President's Executive Memorandum of October 26, 1993 on "Streamlining Procurement Through Electronic Commerce." The Memorandum directs the head of each executive department or agency to ensure that budgetary resources are available for electronic commerce implementation in each respective department or agency.

(4) Developing Applications/Demonstrations. These programs focus on a specific application of electronic commerce, demonstrating the feasibility and potential value of a particular electronic commerce architecture.

Electronic Commerce

Agency Contributions

Development of Technology

Federal Public Key Infrastructure Pilot Program (DoC/NIST)

Electronic Component Development (DoE)

Development of Standards

Defense Message System (DoD/DISA)

Digital Signature and Security Services System (NASA)

Development of Architectures

Electronic Billing and Payment for the Manufacturing Industry (DoC/NIST, DoE, Treasury)

Technical Architecture Framework for Information Management (DoD/DISA)

Infrastructure Security Projects (DoD/DISA, DoE, SBA)

Electronic Acquisitions (GSA, VA)

Development of Applications/Demonstrations

Rural Business Enterprise Grants Program (USDA/RDA)

Electronic Commerce/Electronic Data Interchange Projects (USDA, DoD, DoE, EPA, DHHS, DoL, HUD, NSF, VA)

TECNET network and database (DoC/NIST, DoE)

Electronic Proposal Project (DoE)

AMTEX - Demand Activated Manufacturing programs (DoE)

CALS Roadmap 2000 (DoE)

Open Systems Laboratory (DoE)

Electronic Data Interchange for Selected Industry Sector Reporting (EPA)

Electronic Submission of Single Family Claims (HUD)

Postal Electronic Commerce Services (NASA)

International Trade Data System (Treasury)

Technology 2020 (TVA, DoE)

**Electronic Copyright/Management System (ECMS) (Library of Congress)

**Although not formally part of the Administration's Budget Process, the Library of Congress wished to include this project for the report.

I. Environmental Monitoring and Natural Resources Management -- Overview of Application Area

Just as we monitor industrial output, consumption of goods and services and other indicators of economic health, so must we monitor environmental indicators to judge the state of the environment. An improved National Information Infrastructure (NII) will allow for the development of a nationally integrated network of observing systems, computational centers, archives, libraries and information dissemination systems to address the Nation's needs for environmental data and information. Such an infrastructure will serve as an enabling integrating agent for diverse observational data and information by building upon the national investment (both public and private) in environmental monitoring, protection, and natural resources management activities.

Past and current environmental monitoring have proven highly effective for collecting and processing large quantities of environmental data. However, the ability to perform comprehensive environmental monitoring currently is limited in two critical areas. First, the infrastructure for data collection and analysis is extremely fragmented. This limits the capacity to provide timely access to data and/or information in standard formats. Secondly, there is a lack of information tools to make detailed, comprehensive environmental measurements, and then to integrate and interpret them in support of a host of scientific, policy and operational uses. Raw data needs to be converted into useful information which conveys the multi-disciplinary nature and interconnectedness of environmental factors, thus providing a framework for improved policy and investment decisions.

The nationally integrated networks and tools proposed for development under the NII agenda will permit analysts, scientists, policy makers and the general public to have better access to more reliable information. Measurable progress in this regard will be observed in several areas: (1) reduced time to assemble environmental information for emergency action; (2) enhanced ability to locate and retrieve comprehensive, up-to-date, critical data for economic analysis and environmental policy considerations; (3) improved quality of environmental research, due to improved access to multiple agency databases; and (4) enhanced enforcement of government regulation for pollution control and natural resource utilization. There is the additional benefit that environmental information will be made more transparent, allowing both the public and policy makers to better track the economic benefits of annual investments in environmental observation and protection.

II. Environmental Monitoring and Natural Resources Management -- Highlighted Initiatives

The programs highlighted for environmental monitoring and natural resources management activities promote the goals of environmental research and modeling, information access/connectivity, and interoperability of heterogeneous information systems. Critical to achieving these goals is the role of the High Performance Computing and Communications (HPCC) Program. Technologies developed by HPCC participating agencies and others will provide new algorithms; computational and information processing tools; transport mechanisms; and data translation services to support the environmental monitoring and natural resources management applications of the NII.

(1) Environmental Research and Modeling. The US Global Change Research Program, which involves academia, the private sector and most US agencies with environmental programs, consists of research activities that involve deployment of a number of new environmental observing systems. The networking component of this program is embodied in the Global Change Data and Information System (GCDIS) which is intended to provide the appropriate level of communications technology, interoperability, and connectivity to allow easy exchange of data among participating agencies. Other smaller projects are also being undertaken to support research applications with environmental monitoring data.

(2) Information Access/Connectivity. The Federal Geographic Data Committee (FGDC) has as its goal the creation of a national digital geographic information resource, known as the National Spatial Data Infrastructure (NSDI). The scope of the NSDI includes all geographic or "spatial" data including climatic, demographic, natural resource, oceanographic, and geophysical data. The GCDIS, mentioned above, plans to develop network interconnectivity, interagency gateways, and establish procedures and policies for global change data and information dissemination among the participating agencies. Other initiatives include projects for increasing access to energy efficiency and renewable energy information available via the Internet. This information, which includes databases, bulletin board systems, on-line catalogs, and lists of manufacturers and vendors, will assist state governments in implementing provisions of the Energy Policy Act of 1992 and voluntary initiatives of the Climate Change Action Plan.

(3) Standards and Interoperability. The issue of common standards and/or interoperability is a central component to most of the highlighted initiatives. The FGDC has taken a lead role in the development of data content, exchange and metadata standards needed to implement the NSDI. The primary focus of the GCDIS is to establish and maintain effective mechanisms to integrate the disparate elements of global change information and data. Current plans call for the adoption of common standards for data exchange.

Environmental Monitoring and Natural Resources Management

Agency Contributions

Environmental Research and Modelling Programs

Infrastructure Project (USDA/Forest Service)
 Eastside Ecosystem Management Program (USDA/Forest Service)
 Resource Management Applications Program (USDA/Forest Service)
 Satellite Active Archive for on-line environmental satellite imagery dissemination (DoC/NOAA)
 MOSIAC implementation on environmental information dissemination systems (DoC/NOAA)
 Support Seasonal Forecasting (DoC/NOAA)
 *Geophysical Fluid Dynamics Laboratory atmospheric and oceanic modelling (DoC/NOAA)
 *Support for National Meteorological Center (NMC) (DoC/NOAA)
 Distributed Generation and Use of a Synthetic 3D Seismic Dataset (DoE/Defense Programs)
 NII Accessibility for Independent Gas and Oil Producers (DoE/Defense Programs)
 Clean Water Act, Section 305 (b) (EPA)
 Information Collection Rule (EPA)
 Remote Sensing Databases (NASA)

Information Access/Connectivity

Natural Resource Data Management and Dissemination (USDA/Forest Service)
 Base Network Connectivity (DoC/NOAA)
 Interagency National Environmental Index (DoC/NOAA)
 Management and Dissemination of Weather Data in Near-real-time (DoC/NOAA)
 Global Learning and Observation to Benefit the Environment (DoC/NOAA, NASA, NSF, EPA, and other agencies)
 *Information Dissemination Activities (DoC/NOAA)
 Digital Library for Energy and the Environment (DoE)
 Energy Efficiency and Renewable Energy -- The Energy Efficiency and Renewable Energy Network (DoE)
 Energy Efficiency and Renewable Energy -- FEMP Electronic Superhighway (DoE)
 Energy Information Highway Program (DoE)
 Development of Safe Drinking Water Information System (EPA)
 Inventory and Reporting of Chemical Usage (EPA)
 TRI Information Systems (EPA)
 Support for Enforcement Targeting, Tracking, and Compliance Activities, including FFTS, FFIS, and FAHWCD (EPA)
 Support for IDEA to Analyze and Develop Enforcement Targeting Possibilities (EPA)
 Second Phase of Technology Transfer Network (EPA)
 Electronic Review and Revision System for SIPS (EPA)
 Public Access Efforts (EPA)
 National Biological Survey (NBS) / National Biological Information Infrastructure - NBII (DoI/NBS)
 Earth Observing System (EOS) Program Digital Library and Data & Information System (NASA)
 Global Meteorological Satellites (GMS) Online (NASA)

Data Standards and Interoperability

Resources Management Applications Program (USDA/Forest Service)
 NSDI - Environmental Data - Soil Conservation Service (USDA)
 NSDI - Digitized Soils Maps - Soil Conservation Service (USDA)
 Common Survey Data Structure Project (USDA/Forest Service)
 National Spatial Data Infrastructure - NSDI (DoI/FGDC)
 Data Integration and Management efforts (EPA)
 Modernization of STORET National Water Quality System (EPA)
 Development of Environmental Information Acquisition and Architecture (EPA)
 Standardization of Key Information Identifiers (EPA)

* Indicates initiative has been identified by the NSTC R&D Budget Cross-cut

I. Government Services -- Overview of Application Area

Today, the use of information technology (IT) can create a government that overcomes the barriers of time and distance to perform the business of government and provide information and services to the public. Information technology can swiftly be employed to transfer funds, answer questions, collect and validate data and keep information flowing smoothly within and outside government. In an electronic world, high speed information links will carry the data necessary to support government operations. The development of this infrastructure will enable the creation of "virtual agencies" which will allow citizens access to integrated program information and services.

The National Performance Review (NPR) has been an important element of the Administration's efforts to improve the delivery of government services. In the NPR report, Vice President Gore recommended an executive order to create a customer driven government. The President signed this order on September 7, 1993 and set a standard for government services to equal the best in business.

The NPR's Reengineering Through Information Technology team noted that customers of government services often find dealing with the federal bureaucracy to be complicated, slow, and confusing. Uncoordinated, cumbersome, paper based delivery of government services further complicates the customers' efforts. To address this problem, the NPR IT report outlined a three part agenda for spreading information technology's benefits to the federal government: (1) strengthen leadership in information technology, (2) implement electronic government, and (3) establish support mechanisms for "electronic government." The NII initiatives highlighted below will help accelerate the Administration's transition to an "electronic government."

II. Government Services -- Highlighted Initiatives

NII programs fund the development of information systems and support services in the following five categories:

(1) **Proposed Information Access.** Information access programs will improve public access to government information by allowing agencies to make such information available electronically. These investments include the National Telecommunications and Information Administration's (NTIA) Telecommunications and Information Infrastructure Assistance Program (TIIAP), which awards competitively-selected matching grants to state and local governments, public institutions, and non-profit entities to help them access new telecommunications and information technologies. The TIIAP will allow state and local governments to make government information more accessible to its citizens and to deliver social services in a more efficient manner. In FY 1994, 15 grants were awarded for these types of applications.

II. Government Services – Highlighted Initiatives (Continued)

(2) Proposed Implementation of National Performance Review (NPR). Implementation of the Administration's NPR information technology recommendations will provide the necessary investments to facilitate the transition to an "electronic government." Projects include investments to establish an electronic mail address directory for the entire federal government; reduce the burden on employers of filing wage and tax data by sharing information among States and the IRS; create multi-agency electronic benefits transfer (EBT) for payment of government assistance services; and speed import/export processing while providing integrated trade data to policy makers.

(3) Proposed Investments in Service Delivery. This category encompasses programs that will use information technology to deliver services such as loans, benefits, and grants directly to the public. These investments build on the High Performance Computer and Communications (HPCC) Program's research, including voice and signature recognition, to bring the benefits of federally-sponsored R&D into the lives of Americans on an everyday basis. Benefits from these proposed investments include improving the timeliness of service delivery, making government services more readily available to the public through electronic means, and allowing the use of electronic filing of information collections wherever possible.

(4) Proposed Initiatives Supporting General Information Infrastructure Development. As the federal government moves closer to an "electronic government," the agencies will need to provide upgrades to their existing communications networks. This category captures a broad range of agency initiatives that will enhance the government's existing telecommunications infrastructure and assist in the development of employee bulletin board systems and local and wide area networks. This category also includes programs that will accelerate critical NII enabling technologies and provide direct funding and loans for telecommunications and computer network infrastructure enhancements in both the public and private sector.

Government Services

Agency Contributions

Information Access Projects

Electronic Information Delivery at the National Agriculture Library (USDA/NAL)
National Agriculture Statistics (USDA/NASD)
NSDI Environmental Data - digitization and increased access (USDA/SCS, interagency)
STAT-USA Data Dissemination (DoC/Census)
Office of Defense Conversion (DoC/EDA)
Telecommunications and Information Infrastructure Assistance Program (TIIAP) grants (DoC/NTIA)
Patent and Trademark Information On-line (DoC/PTO)
Libraries, Dissemination, and Distance Learning (Ed)
Agency Implementations of the Recommendations of the Electronic Mail Task Force (Government-wide)
Electronic Research Administration Program for the Management of Grants (DHHS/NIH)
Reengineered Disability System (DHHS/SSA)
Federal Geographic Data Committee - National Geospatial Data Clearinghouse (DoI)
National Biological Survey (NBS) / National Biological Information Infrastructure (DoI)
Agency Implementation of the Government Information Locator Service - GILS (DoI, interagency)
Combined DNA Index System (CODIS) (DoJ/FBI)
Freedom of Information and Privacy Act Document Processing System Project (DoJ/FBI)
Access to IMIS Information (DoL, EPA)
Training Technology Resource Center (DoL)
Employment and Training Administration - Training Technology Resource Center (DoL)
OSHA - Access to Integrated Management Information System Information (DoL/OSHA)
Data Integration and Public Access Efforts (EPA)
Clearinghouse on Computer Accommodation - IT Accommodation and Accessibility (GSA)
National Technology Transfer Center (NTTC) Gateway and Resource Center (NASA)
Division of Public Programs: A National Conversation on American Pluralism and Identity (NEH)
Export Assistance (SBA)
Business Information Centers (SBA)

National Performance Review Projects

Plan for the Effective Use of IT Throughout Government - Support of GITS, E-mail, etc. (DoE, GSA)
Electronic Benefit Transfer (USDA, DHHS, Treasury)
Coordinate, Recommend, and Implement IT Initiatives to Improve Customer Service (EPA, GSA)
Work with Private Industry to Advance the Implementation of IT to Provide Citizen Access to Government (GSA)
One-stop 800 Number Calling Service (DoE, DHHS/SSA, GSA, DoL, Treasury)
Implement an Integrated, One-stop Government Services Kiosk (DHHS/SSA, DoJ/INS, Treasury, GSA, USPS, VA)
Implement an Integrated, One-stop On-line Service (DoE, DHHS, DoL, GSA, NEH, SBA, NARA)
National Law Enforcement / Public Safety Network (USDA, DoJ/FBI, Treasury)
Intergovernmental Tax Filing (DHHS/SSA, Treasury/IRS)
International Trade Data Index (Treasury/Customs)
National Environmental Data Index (DoC/NOAA)
E-mail Networks and Support (DoE, DoL/OSHA, DHHS, GSA, SBA)
Telecommunications & Post-FTS2000 Environment (DoD/DISA, GSA)
Consolidate and Modernize Government Data Processing Centers (DHHS, DoL, Treasury)
Reengineer Basic Systems for Improved Delivery of Government Services (GSA, Treasury)
Consolidate and Integrate Federal Government Private Networks (GSA, Treasury)
Ensure Network System Privacy and Security (DoC, DoD/DISA, DoD/NSA, DoE, DoJ, GSA, SBA)
Provide Training and Technical Assistance in IT to Federal Employees (USDA, DoD/DISA, DoL, GSA, NEH)

Table continues on next page.

Government Services (cont'd)

Agency Contributions

Service Delivery Projects

InfoShare (USDA)
Medical Transaction System Initiative (DHHS/HCFA)
Reengineering Disability System (DHHS/SSA)
Social Security Automation Investments (DHHS/SSA)
Submission Management and Review Tracking (SMART) Program (DHHS/FDA)
Electronic Submission of Single Family Claims (HUD)
Automated Land and Mineral Record System - ALMERS (DoI/BLM)
Implementation of "CSHO 2000" Project and Development of Electronic Reference Materials (DoL/OSHA)
Technological Innovation and New Applications (DoL)
Archival Information Infrastructure (NARA)
VBA Modernization (VA/VBA)

Initiatives Supporting General Information Infrastructure Development

Rural Telecommunications Loans (USDA/REA)
Rural Telecommunications Partnership Loans (USDA/REA)
Rural Business Enterprise Grants (USDA/RDA)
Rural Telephone Bank (USDA/REA)
Telecommunications and Information Infrastructure (USDA)
Americorps Program (USDA)
Advanced Technology Program -- Component Based Software (DoC/NIST)
Defense Information Systems Network (DISN) (DoD/DISA)
Office of the Future Pilot (DoE, DoD, DHHS, NASA, NSF)
eXperimental University NETwork (XUNET) (DoE)
*Exploration of High Speed Networking Technologies (DoE/Human Resources, DoE/Defense Programs)
*ARIES Testbed (DoE)
Electronic Component Development (DoE)
Interbank Check Image (DoE)
Automation Investment Fund (DHHS/SSA)
Integrated Disbursement and Information System (HUD)
Minerals Management Service (MMS) / Wide Area Network (DoI/MMS)
National Park Service (NPS) / ParkNet II (DoI/NPS)
National Spatial Data Infrastructure - NSDI (DoI/FGDC)
Automation and Data Sharing Initiatives (DoJ/DEA, DoJ/FBI, DoL)
Office of the American Workplace BBS (DoL)
Integrated Management Information System (DoL/OSHA)
Local/Wide Area Network Deployment (DoE/Defense Programs, DHHS/SSA, DoI, DoL, NARA, SBA)
Implement Federal/State/Local Information Infrastructure Pilot (GSA)
Preservation and Dissemination of Humanities Resources (NEH)
Research on New Technologies for the NII (NSF)
Research Infrastructure (NSF)
Computational Science and Engineering Applications (NSF)
NSFNet (NSF)
Supercomputer Centers (NSF)
Project ACCESS (SBA)

* Indicates initiative has been identified by the NSTC R&D Budget Cross-cut

I. Health Care -- Overview of Application Area

National, state and local debate over the past year highlights the importance of health as a National Information Infrastructure (NII) application area. The goals of health care reform are to improve quality, expand access and contain costs. Health expenditures constitute a large and growing proportion of the Nation's economy. Applications such as automated claims and payment transactions, telemedicine, on-line access to clinical records, and on-line access to the latest treatment and prevention information, will help advance the health reform goals in fundamental ways.

Today's health sector, although information intensive, has not capitalized on computers and information networks as have other market sectors. Computers have been used in individual care settings and have begun to improve billing and claims transactions, but most clinical systems are not interoperable and patient information is created and re-entered numerous times. In addition, without easy communication among researchers, providers and consumers, new discoveries on prevention and care are not readily or rapidly disseminated.

Private and public sector interests in health care, health insurance, and health promotion have all begun to invest in and explore the many opportunities for the NII to improve health. Many of these initiatives show significant promise, but examine new, and as yet unproven, applications. In addition, some of the fundamental infrastructure needed to support broad implementation of new applications is lacking, most notably data exchange and content standards, such as those for medical records. The public comments on the draft health applications paper in "Putting the Information Infrastructure to Work" indicated strong support for federal government involvement in facilitating the NII and its health applications in partnership with private sector efforts. The health application paper is available through the IITF Secretariat.

The federal government is both a provider and user of the many health applications the NII supports. Many of the existing National Library of Medicine (NLM) High Performance Computing and Communication (HPCC) projects represent important research and development initiatives in health. The federal government has also been involved in a number of key investment areas, including telemedicine, standards, increased public access to health information, and research and demonstrations projects that support health specific information infrastructure.

Current and planned federal investments cover most of the important aspects of health applications, with a few exceptions. The most visible and perhaps biggest public concerns regarding health applications involve privacy and security. There is little federal investment specific to health care regarding these concerns, probably because these concerns are better met by policies rather than investments. In the absence of legislation, health specific privacy and security guidelines should be pursued. Second, the uncertainty of health applications and the extreme pressure to contain health care costs support a greater federal role in evaluation of applications. Evaluation requirements will become an increasingly critical component in funded projects. Finally, increased government support is needed to expedite private initiatives for consensus standards development.

II. Health Care -- Highlighted Initiatives

The programs highlighted for health applications promote four goals, three of which are the goals of health care reform, i.e., access, quality, and cost containment. The fourth goal is development of the supporting infrastructure that will facilitate linkages among the applications supporting the health goals.

(1) **Access to Care.** Highlighted projects supporting increased access to health care are telemedicine and health-oriented community network investments. The Office of Rural Health, the Health Care Finance Administration (HCFA), the National Institutes of Health (NIH), and the National Aeronautics and Space Administration (NASA) are all investing in telemedicine projects that will increase access to care for remote areas nationally, and in the case of NASA's project, internationally. These projects also advance the NII goals of extending the universal service concept. The Public Health Service (PHS) has invested in a project called the Community Services Work Station. This project provides a community network that links a broad array of health and social services to provide enhanced information and access to services regardless of where an individual initially comes for help. The workstation demonstrates the value the NII can bring to a community for health and other purposes. This project will extend the universal service concept and will help coordinate policies and approaches among levels of government, in this case local, state and federal.

(2) **Quality.** Highlighted projects supporting improved quality of health care include the access projects already discussed, because increased access to care by its very nature can improve care. Also important are the many federal initiatives to increase the public's access to health information and comparable initiatives to give providers access to patient information and the constantly expanding health research knowledge base. Although the individual projects are too numerous to be identified individually, this report highlights the broad array of such projects. For example public access projects include: the Directory of Information Resources Online (DIRLINE), the Physician Data Query (PDQ), AIDSLINE, AIDSTRIAL, AIDSDRUG, HSTAT, the Health Care Financing Administration's on-line project, the National Health Information Center, and 1-800 lines that service the same information links but without computer access. Provider patient care information and knowledge base projects include: Rural Extension Administration's Distant Learning Medical Link; NLM and the Agency for Health Care Policy and Research computer-based patient record initiatives; Veterans Affairs' electronic medical record initiative; DoE's GRAIL program, NLM medical connections program; and, high performance communications for PDQ, Cancernet and electronic publishing as well as the current PDQ and HSTAT on-line services for providers. The CDC INPHO and WONDER projects also provide an integrated network for public health officials and an interactive information system for state, local, and academic health professionals respectively. Both the INPHO and WONDER will improve the accessibility and exchange of health promotion and disease prevention related information. All of these projects advance the NII goals of providing access to government information and furthering the universal service concept.

II. Health Care -- Highlighted Initiatives (Continued)

(3) Cost Containment. The projects supporting health care cost containment include the information access and quality projects already discussed that will help consumers and providers know more about prevention and appropriate care. Highlighted cost containment projects include federal investments in health data exchange and content standards and administrative streamlining applications. Within HHS, HCFA and the Agency for Health Care and Policy Research both have investments in standards development. Standards are recognized as the linchpin for the coordinated development and implementation of health applications. Standards are critical to create greater certainty for applications investments and support improved longitudinal health care records. In the short term standards will allow streamlined claims and payment that will reduce administrative costs. In addition to the standards themselves, HCFA is developing improved claims processing that will reduce the administrative costs for Medicare and Medicaid while allowing for improved interoperability with other insurers for coordination of benefits. These projects advance a number of the NII goals, but most notably promotion of seamless, interactive, user driven operation.

(4) Infrastructure Investments. There are numerous investments in support of infrastructure development particular to health applications. Some important projects to highlight include: NLM's HPCC health care applications research and demonstrations support for testbed networks; NCRR Information Infrastructure Technology applications support; the National Institute of Standards and Technology's Advanced Technology Program's Information Infrastructure for Health Care -- a program designed to develop tools and prototype systems for health care that also accelerate infrastructure development; NASA's collaboration with the Health care Open Systems & Trials (HOST) consortium comprised of providers, insurers and IT companies working jointly to increase access to care through the use of advance information technology, initially focusing on computer-based patient records and an integrated community health care information network; in FY 1994, grants from the National Telecommunications and Information Administration's Telecommunications and Information Infrastructure Assistance Program (TIIAP) presented 14 awards for health applications. All of these support expedited development of integrated health applications. This in turn supports the NII goals of promoting private sector investment; acting as a catalyst to technological innovation and new applications; and promoting seamless interactive user driven operation.

Health Care

Agency Contributions

Health Care Access Programs

Community Facility Loans (USDA/RDA)
 Community Services Work Station (DHHS/PHS)
 Telemedicine Demonstrations (USDA/REA, DHHS/HCFA, DHHS/NIH, DHHS/ORH, VA)
 International Telemedicine Health Care Telecommunications Network (NASA)

Health Care Quality Programs

REA Distance Learning Medical Link Loan and Grant (USDA/REA)
 Computer based Patient Record (DHHS/AHCPR)
 1-800 telephone lines (DHHS/HCFA, DHHS/CDC, NHIC, & CANCER)
 Internet/computer links (DoE; DHHS: CDC, CRDL, NHIC, HSTAR, HCFA, NLM, ODPHP, SAMSHA; DoL/OSHA; NASA)
 Kiosk access to specific health applications (DHHS/SSA)
 Wonder System (DHHS/CDC)
 Electronic Medical Record (VA)

Health Care Cost Containment Programs

Medicare Transaction System (DHHS/HCFA)
 Standards Initiatives (DHHS/HCFA)

Infrastructure Investments Specific to Health

Telecommunications and Information Infrastructure Assistance Program (TIAP) grants (DoC/NTIA)
 ATP Information Infrastructure for Health Care (DoC/NIST)
 NLM Medical Connections program (DHHS/NLM)
 Global Health Monitoring Network (NASA)
 Health Care Open Systems & Trials - HOST (NASA)

I. Manufacturing -- Overview of Application Area

An advanced National Information Infrastructure (NII) will enable manufacturers to transform and significantly improve all stages of manufacturing operations, from technology/market assessment and R&D to after-sales support and product disposal or reuse. Manufacturers will be able to use the NII to quickly and efficiently transfer data within and among operations; to effectively and sensibly transact business and collaborate with customers, clients and competitors; to rapidly and "virtually" prototype, simulate, and test products and processes; and to make easily and readily available the best manufacturing tools, knowledge bases, product information, and training materials regardless of location.

At present there exist a number of barriers to achieving this vision. Much of the manufacturing of the future will be done at multiple sites that are networked together. At this time however, there is not an effective mechanism to integrate all of the diverse manufacturing operations. In addition, the existing manufacturing systems do not have interfaces that conform to national (or international) standards, making it expensive for sharing of manufacturing information which is necessary to meet ever-changing customer demands in a timely, responsive and flexible manner. There is not a well developed framework of standard manufacturing processes that readily allows for the prototyping and testing of products from process models. There is also a need for more structured information about manufacturing practices and processes. Finally, companies, especially small- to medium-size, will need to change their approach to manufacturing to adopt these new NII technologies, which will require intense training for workers.

To overcome these barriers, the Administration, in cooperation with private industry, has initiated, expanded, and redirected programs designed to unleash the potential of the NII in a variety of civilian manufacturing areas. These efforts address a number of market failures inherent to the development and adoption of new technologies and include: (1) research and development in support of advanced manufacturing technology and high performance computing and communications; (2) programs to demonstrate, test, and deploy NII manufacturing applications into the private sector; and (3) programs designed to improve manufacturing education and training.

While there are many government sponsored programs designed to facilitate the development, demonstration, and deployment of NII manufacturing applications, there are areas where the government should be investing more time and effort. For example, there is a need to accelerate the development and testing of industry-led standards for product data exchange, electronic commerce, and interoperability. There is also the need to provide more testbeds where NII applications can be prototyped and demonstrated in collaboration with industry as well as focused efforts in user-acceptability and information conversion. Lastly, and perhaps most importantly, the government needs to expand its technical assistance programs and to initiate serious efforts to address industry's needs in the areas of organizational learning and worker training.

II. Manufacturing -- Highlighted Initiatives

The Administration has crafted a government-wide strategy to speed the development and application of advanced manufacturing technologies. Federal involvement within the Manufacturing Area can be divided into the following categories:

(1) **Research and Development.** Programs falling under this category include infrastructure development that supports manufacturing applications. In addition to the base programs within the agencies there are two key thrust areas that are part of the research and development efforts within the National Science and Technology Council (NSTC): the High Performance Computing, Communications and Information Technology (HPCCIT) Subcommittee is promoting the application of information technology to the national challenge of manufacturing using the Information Infrastructure Technology and Applications (IITA) Initiative; and the Civilian Industrial Technologies (CIT) Committee is promoting a coordinated interagency effort to promote the development of advanced manufacturing technologies. Other key initiatives include:

- ***Systems Integration for Manufacturing Applications (SIMA) program (DoC/NIST).*** SIMA is an effort to develop, refine, test, and transfer advanced, computer-integrated, electronically-networked manufacturing technologies and associated applications. Research activities will focus on developing integration technologies, architectures, communication protocols and interface specifications for manufacturing software applications that support design, planning and production of products in the mechanical, apparel and process plant industries. A standards-based data exchange effort will target flexible computer integrated manufacturing issues to alleviate the lack of data exchange capability between manufacturing applications.
- ***Agile Manufacturing Initiative (NSF).*** This initiative includes a prototype of an information infrastructure to support distributed concurrent engineering, flexible manufacturing, and electronic commerce in manufacturing applications. The vision of agile manufacturing is to enable virtual companies to be formed by linking design and manufacturing operations that are physically distributed among a group of companies.
- ***Advanced Technology Program (ATP) Computer-Integrated Manufacturing (CIM) for Electronics program (DoC/NIST).*** The ATP provides funding to support critical research needed to develop key commercial technologies and to bring innovative products to market. CIM will increase substantially the base of suppliers of third-party electronics manufacturing software. The intention is that this supplier base would serve not only electronics manufacturers, but also other major manufacturing sectors such as automotive and aerospace. These goals will be achieved by encouraging electronics manufacturers to define and adopt an open CIM framework which will provide a market for others to design compliant software systems. This will permit manufacturers to rapidly respond to new market opportunities by being able to easily reconfigure their shop floor systems.

II. Manufacturing -- Highlighted Initiatives (Continued)

(2) Deployment. Programs in this category include initiatives that bring useful technologies into the marketplace and further their adoption by the private sector.

- ***Technologies Enabling Agile Manufacturing (TEAM) program (DoE).*** TEAM will enhance industrial competitiveness by advancing and deploying manufacturing technologies that promote agility. TEAM is leveraging the expertise and resources of private industry and federal agencies to develop, integrate, and deploy leap-ahead technologies enhancing the responsiveness, flexibility, and cost-effectiveness of U.S. industry. The technologies and methodologies deployed by TEAM in the five thrust areas of Product Design and Enterprise Concurrency, Virtual Manufacturing, Manufacturing Planning and Control, Intelligent Closed-Loop Processing, and Integration will enable manufacturers to transition products from design to production faster, more efficiently, and at lower cost.
- ***Manufacturing Extension Partnership (MEP) Program's Electronic Communication Linkages (DoC/NIST).*** The MEP is an industrial extension service designed to transfer developed technologies to applications appropriate for smaller businesses. The MEP is designed to be a comprehensive, yet locally responsive, network of centers that help firms upgrade their equipment, improve their processes, and strengthen their business performance. The MEP is sponsoring a specific pilot program which will demonstrate the potential value of linking the extension centers using a major network system.

(3) Education and Training. Programs that not only educate the manufacturing community as to the benefits of NII-related technologies, but also provide training to users of the technologies.

- ***Technology Information Environment for Industry (TIE-IN) Program (DoE).*** TIE-IN is a new mechanism being developed by Sandia Labs for technology transfer that can realistically reach a large percentage of the small to mid-sized companies in the U.S. It has two primary goals: (1) to reach thousands of establishments, and (2) to reduce the industry investment required to use National Laboratory technologies. TIE-IN will utilize the NII and information technologies to build smart front-ends for many existing DoE technical capabilities and electronically guide users through the process of obtaining solutions. By using these smart front-ends both the required amount of direct staff interaction with the users and the investment required by industry can be minimized. TIE-IN will operate as an electronic extension service accessible from Internet or modem to allow the user to quickly obtain solutions to problems from remote locations.

Manufacturing

Agency Contributions

Research and Development

Rapid Response Manufacturing (DoE)

* Advanced Technology Program Computer-Integrated Manufacturing for Electronics (DoC/NIST)

* Systems Integrated Manufacturing Applications (DoC/NIST)

Information Integration for Simulation Based Design & Manufacturing (NSF)

* Agile Manufacturing Program (NSF)

Deployment

Rural Business Enterprise Grants (USDA/RDA)

Manufacturing Extension Partnership Electronic Communication Linkages (DoC/NIST, DoE)

Advanced Manufacturing-NII (AM-NII) (DoE)

Object Oriented Design of Integrated Distribution Systems (DoE)

Technologies Enabling Agile Manufacturing (TEAM) (DoE)

Affordable Design and Manufacturing (ADAM) initiative (NASA)

Oak Ridge Centers for Manufacturing Technology -- Skills Campus/Virtual Enterprise Resource Center (TVA, DoE)

Education and Training

* Computational Testbed for Industry (CTI) (DoE)

Technology Information Environment for Industry (TIE-IN) program (DoE)

CALS Roadmap 2000 (DoE)

* Indicates initiative has been identified by the NSTC R&D Budget Cross-cut

I. Transportation -- Overview of Application Area

Effective use of existing transportation systems and infrastructure is central to achieving high levels of performance and efficiency in meeting our transportation needs. Overlaying the existing transportation infrastructure with a complementary information infrastructure could dramatically improve transportation service, cost, safety and efficiency. Collective advances in information technology permit the development of an "intelligent" transportation system, in which system operators and users share information and cooperate to enhance system performance, efficiency, capability, and user satisfaction.

At the policy level, the implications of wide-scale application of information technology to transportation -- technology development, economic and physical access to technology solutions, and the safety impacts of applying various technologies -- have yet to be thoroughly assessed. Existing agency programs have evolved individually and lack a comprehensive understanding of transportation information needs across agencies or the crosscutting needs of national significance.

Compared to the use of information technology in air traffic control at the applications level, the nation's transportation sector has yet to maximize its use of modern sensing, communication, and information technologies. These technologies have much to offer activities such as routing transit buses, managing harbor traffic, optimizing urban highway use at rush hour, or dispatching maintenance crews. Replacing conventional approaches with methods employing modern technology will require transportation providers to totally re-conceptualize and re-engineer these functions.

Technology development to support the vision of an "intelligent" transportation system is needed to address deficiencies in several key areas. Tools for timely production of electronic maps and charts for navigation and route planning are inadequate; methods for keeping safety-critical electronic map and chart information current are limited. New weather systems are poised to provide vast sources of information that can be used to avert transportation accidents and adverse travel situations, yet the ability to analyze and disseminate such information in meaningful ways is lagging. There is a need to better understand the impact of weather on transportation operations (particularly in the surface modes) and the potential for weather information to influence transportation safety and efficiency. Transportation command/control functions and surveillance options for increasing uniform situation awareness among system and vehicle operators represent areas where further technology development and application would be helpful.

The NII initiatives for transportation provide the basis upon which current deficiencies can be addressed. These initiatives also establish a framework for assessing and developing information technology for transportation. Short-term objectives of the initiatives include agreeing upon a unified system architecture with uniform standards, procedures, and protocols for system development, implementation, operation and maintenance. This will facilitate both establishing a consensus on the roles and responsibilities of participants in the transportation system and reaching agreement on strategies to balance efficiency, mobility, safety, health and environmental impacts.

II. Transportation -- Highlighted Initiatives

The federal government's efforts within the transportation application area have been divided into five categories: Intelligent Vehicle-Highway Systems; Spatial Data and Reference Infrastructure; Mesoscale Aviation Weather Systems; Air Traffic Management and Control; and Waterway Management and Vessel Traffic Systems.

(1) Intelligent Vehicle-Highway Systems (IVHS). A public/private partnership to develop and apply a variety of vehicle, roadway, electronics, communications, and information processing technologies and services critical to improve the efficiency and/or safety of our surface transportation systems.

(2) Spatial Data and Reference Infrastructure. Initiatives in this category will accelerate the development of spatial relationships throughout all transportation systems that are critical for tracking and locating.

(3) Mesoscale Aviation Weather Systems. Programs in this category will help to develop real time weather systems able to forecast the weather in a small region.

(4) Air Traffic Management and Control. These programs will develop enhanced precision, more flexible, higher quality Air Traffic Control management capabilities to reduce delay and operating costs to system users during excessive system demands.

(5) Waterway Management & Vessel Traffic Systems. These programs will develop waterway management and control techniques, communication and presentation of infrastructure, and senior technology critical to waterway management and vessel traffic.

Transportation

Agency Contributions

Intelligent Vehicle-Highway Systems IVHS (including APTS)

- *Wireless Microwave Communications and Sensors for IVHS (DoD)
- *Demonstrations and Other Activities (DoT/FHWA, DoT/FTA, DoT/NHTSA)
- *Research and Development (DoT/FHWA, DoT/FTA, DoT/NHTSA)

Spatial Data and Reference System

- Differential Global Positioning System (DoT/FAA, NASA)
- GPS Wide Area Augmentation System (DoT/FAA)
- *Electronic Maps and Charts (DoT/FAA, DoC/NOAA)
- *Satellite Navigation R&D (DoT/FAA)

Mesoscale Aviation Weather Systems

- Manage and Disseminate Weather in Realtime (DoC/NOAA)
- ASR Weather Systems Processor (DoT/FAA)
- Aviation Weather Products Generator (DoT/FAA)
- Integrated Terminal Weather System (DoT/FAA)
- *Aviation Weather Detection / Dissemination (DoT/FAA)
- *Weather System Planning and Impact Assessment (DoT/FAA)

Air Traffic Management and Control

- *Sensors for Air Transportation System Capacity and Safety (DoD)
- Terminal Area Productivity (TAP) (DoT/FAA, NASA)
- ATC System Infrastructure (DoT/FAA, NASA)
- *Airport Surface Traffic Automation (DoT/FAA)
- *Air Traffic Management Technology (DoT/FAA)
- *Oceanic ATC Automation (DoT/FAA)
- *Terminal Area Surveillance System (DoT/FAA)
- *Terminal ATC Automation (DoT/FAA)

Waterway Management & Vessel Traffic Systems

- Infrastructure Deployment (DoT/USCG, DoT/MARAD, DoC/NOAA)
- *Research and Development (DoT/USCG, DoT/MARAD, DoC/NOAA, DoD/ACE)

* Indicates initiative has been identified by the NSTC R&D Budget Cross-cut

for
official
use
only

*NEC Work on Infrastructure
Wed, 11/2/94, 11:30 P*

INFRASTRUCTURE NOTES -- NEC WORK GROUP *NEC Infrastructure*

NEC Paper

The NEC Work Group paper proposes the establishment of State Infrastructure Banks (SIBs). These are not really banks, but rather are revolving funds that States can use to undertake infrastructure spending. At this point, the SIB concept is not completely fleshed out -- decisions still need to be made about: targeting (what types of projects qualify -- transportation or all infrastructure); depth of subsidy; how to ensure that Federal priority projects are funded; whether the program should be mandatory or discretionary spending; and how the program would be funded. The Deputies meeting is intended to provide needed direction about how to proceed on infrastructure.

Points CEA Should Make

- Economic evidence does not suggest that there is an across-the-board shortage of public infrastructure. Treasury and probably OMB will make this point. Alicia Munnell may propose that a National Infrastructure Board be established to study this issue and to recommend policy.
- SIBs may increase the efficiency of Federal infrastructure spending because the subsidy is shallower and because the decisions about project selection priorities are made locally. However, decentralized decisions may lead to rejection of projects with large externalities (e.g., raising rail bridges to allow double stack trains to pass through towns on the way to other locations).
- Political considerations may prevent the efficiency-enhancing strategy of funding SIBs out of existing DOT/EPA funds.
- Chris Edley may propose that infrastructure spending be targeted to disadvantaged communities.
- The tax proposals contained in the NEC paper generally reverse changes made in the Tax Reform Act of 1986 and should be opposed as undesirable tax policy. The sole exception is the taxable infrastructure/tax credit bond proposal, which is efficiency-enhancing, to the extent it substitutes for tax-exempt debt. Note that tax credit bonds may be politically preferred to taxable infrastructure bonds, even though neither has an efficiency advantage over the other.
- We should support reissuing Executive Order 12803 (allowing State and local governments to sell assets that were funded with Federal grants and to use the proceeds for other infrastructure investments without repaying the Federal government its full share).
- We should oppose the GSE options promoted by Felix Rohaytan

(and others). These are generally not very focused, open the Federal government up to large potential losses, and do not address market failures. The Working Group has rejected all GSE options.

- The NEC paper deliberately does not mention funding options. Bob Rubin said at an earlier meeting that it was in appropriate to consider tax increases in the context of constructing the Budget.

- We support the use of congestion pricing. This option may make congestion pricing more palatable and that would be desirable public policy.

THE WHITE HOUSE
WASHINGTON

Oct 28, 1994

MEMORANDUM FOR Thomas Glynn - DOL
Mort Downey - DOT
Bob Sussman - EPA
Dave Barram - DOC
Chief of Staff - HUD
Frank Newman - TRS
Joe Stiglitz - CEA
John Angell - Chief of Staff
Joe Miniarik - OMB
Chris Edley - OMB
TJ Glauthier - OMB
Greg Simon - OVP
Katie McGinty - OEP
Bill Galston - DPC
Pat Griffin - Pol Affairs
Marcia Hale - Intergov Affairs
Gene Sperling - NEC
Bo Cutter - NEC
Sylvia Mathews - NEC

FROM: Michael Deich - NEC

The NEC Deputies will meet on Wednesday, November 2, 12:30-1:30 pm, in room 472 OEOB to discuss infrastructure financing. A background memorandum is attached.

Call 456-5373 to provide clearance information.

21 pages

OPTIONS FOR AN FY 1996 INFRASTRUCTURE FINANCING INITIATIVE

During the FY1996 budget process, the Administration will consider whether the budget should include new resources to fund an initiative that would offer a distinctive Clinton Administration approach to infrastructure. Two issues are before the Deputies:

- what option or options should be considered during the budget process?
- does this memorandum adequately reflect the arguments that should be made for and against devoting new resources to an infrastructure initiative?

Section I of this memorandum provides background on the Administration's infrastructure policies to date. Section II describes baseline infrastructure policies for 1995. Section III evaluates the option that the Working Group believes should form the core of any large initiative. Section IV considers four additional policy tools that the Administration might adopt either as a complement to the larger initiative, or as a substitute for it should the Administration wish to pursue a smaller initiative.

I. THE ADMINISTRATION'S INFRASTRUCTURE POLICIES TO DATE

A. BUDGET POLICIES. Despite very tight budget caps, the Administration has sought significant spending increases for infrastructure. The Administration's 1995 budget requested funding for infrastructure totalling \$34.0 billion. This represented an 11 percent increase over 1993 spending levels but only a 1 percent increase from the 1994 enacted level.

- The Administration's budget requests (see TAB A) have especially favored transportation programs: the FY 1995 budget sought an increase of 3 percent over FY 1994 levels and 15 percent over FY 1993 levels. The proposed spending would have supported "full-funding" of both federal-aid highways and formula grants for transit capital spending.
- The Administration's 1995 Budget requests for wastewater treatment and safe drinking facilities were up 7 percent from 1994 levels and up 5 percent from 1993 levels.¹

¹ As part of NAFTA, the Administration sought \$56 million to capitalize the first tranche of the U.S. capital contribution to the North American Development Bank. The NAD Bank will be instrumental in providing \$2 to \$3 billion in environmental infrastructure for the U.S.-Mexico border region.

The Administration had mixed success with its budget requests. Total 1995 appropriations for infrastructure were \$33.2 billion, or almost 9 percent higher than FY 1993 levels. FY1995 appropriations for both wastewater treatment and for safe drinking water were 12 percent higher than in 1993. However, the Administration did not achieve its goal of "full-funding" for ISTEA -- the 1995 highway program level was \$1.2 billion less than authorized while transit formula grants were \$373 million less than authorized.

B. PROGRAMMATIC REFORMS. In 1993 and 1994, the Administration pursued a number of programmatic reforms in federal infrastructure programs. Congress enacted none of the changes sought by the Administration. The most important of these efforts included:

- Reauthorization of the Safe Drinking Water Act (SDWA) and the Clean Water Act (CWA). The Administration proposals would have created and capitalized a "Drinking Water State Revolving Fund" program and expanded the existing Clean Water State Revolving Fund" program.
- A proposal in the President's 1995 budget to rescind \$4.7 billion in "highway demonstration" projects in order to make available enough funds to fully-fund the core highway programs authorized by ISTEA.
- A proposal to restructure the Federal Aviation Administration as a public corporation.

Congress rejected the Administration's proposed reprogramming of highway funds, and did not complete action on the other Administration proposals noted above. A comprehensive list of the Administration's accomplishments related to infrastructure policies can be found at TAB B.

II. BASELINE INFRASTRUCTURE POLICIES FOR 1995

All agencies agree that the Administration should continue to press the general themes established during the last two years. Although the specific legislative strategy would depend on political developments in coming months, in general the Administration would continue to work on behalf of the legislative initiatives noted above. In addition, the Administration would probably propose or support limited programmatic reforms. These include:

- Reissuing Executive Order 12803, which would stimulate private investment in infrastructure by allowing states and localities to sell certain federally-funded public infrastructure facilities and use the proceeds to make additional public infrastructure investments (see TAB C).
- Supporting legislation that would allow States to set up revolving funds using their Federal highway funds;
- Administrative and regulatory actions to improve the Clean Water SRFs.

III. THE CORE PROPOSAL: CAPITALIZE STATE INFRASTRUCTURE BANKS.²

Under this option, the FY1996 Budget would include increased funding to capitalize "State Infrastructure Banks" (SIBs).³ Although SIBs could be capitalized at any level, the Working Group believes that funding on the order of \$2.5 billion – \$5.0 billion over five years would be needed to induce states to form such Banks.

Permissible Use of Funds -- SIBs would be a more flexible version of existing Clean Water State Revolving Funds. SIBs would be allowed to:

- make below-market loans for local public infrastructure investment;
- provide loan guarantees or other credit enhancements for local public infrastructure debt;
- use the federal grants as a reserve against which the SIB would borrow added funds;
- make subordinate loans in local private projects;
- provide development risk insurance for private projects.
- accept funds from state entities;

Leveraging -- The capitalization grants would be leveraged by requiring that the SIB finance infrastructure projects worth a total of four times the amount of the initial federal grants.

Beneficiary Pays -- To reduce local reliance on financing by general taxpayers, some portion of SIB loans would have to be used to construct or repair facilities that were paid for directly by users (dedicated taxes could be used to repay other SIB subsidies). The exact fraction specified in the Administration proposal would be determined after consultation with the Congress.

Pro:

- During the campaign, the President emphasized the role of public investment in economic growth. The Administration has continued to build a public case for the importance of public investment. The 1994 *Economic Report of the President*, for example, described at some length why "the Administration believes the United States has underinvested in its public infrastructure." Capitalizing SIBs would underscore the importance that this Administration attaches to public investment, and would advance an important part of the President's economic agenda.
- SIB funding would be dramatically more efficient than current federal infrastructure programs. SIBs would "reinvent" federal programs in five principal areas:

(1) *SIBs would leverage federal funds far more than do current programs.* In most existing infrastructure programs, each dollar in federal spending is associated with \$1.25 in total

² A number of proposals have been made to capitalize an off-budget federal infrastructure bank. TAB D discusses why the Working Group opposes the many proposals that have been floated for such a bank.

³ All agencies agree that SIBs would be far more efficient than current programs. In principle, SIBs could be funded by reallocating existing infrastructure outlays. This memo assumes, however, that political constraints require SIBs to be funded as a supplement to, not substitute for, existing outlays.

infrastructure investment. SIBs, in contrast, would be required to leverage federal funds by four-to-one.

(2) *Shallow subsidies would provide incentives to fund only the most productive investments.* Current federal transportation programs cover an average of 80 percent of project costs. Because of the leveraging requirement, however, SIB loans and credit enhancements would provide subsidies that, on average, were economically equivalent to about 25 percent of project costs. (The SIB would tailor each loan or other subsidy to fit local conditions. SIBs could provide subsidies that were economically equivalent to direct grants ranging from zero up to a maximum of 50 percent of project costs.) The shallow subsidy provided by the SIB would provide states and localities with incentives to be more selective in the projects that they choose to build.

(3) *SIBs would give states greater flexibility in the use of federal funds.* Compared to current programs, SIBs could better tailor solutions to fit local problems. SIBs would have more discretion over the type of infrastructure to be built, and the depth of the subsidy needed to build it. Greater flexibility would lead to more efficient solutions to local problems.

(4) *SIBs would increase the amount of private investment in infrastructure.* The vast majority of infrastructure investment is now undertaken by the public sector. SIBs would be allowed to join with private sector firms that wished to invest in infrastructure. The greater private sector investment in infrastructure would result in competition for public providers; greater competition would bring a more rapid adaptation to changes in demand and technology, and would free public resources for other needed infrastructure projects.

(5) *SIBs would reduce the need for general taxpayers to fund infrastructure investments.* At present, much infrastructure is paid for by taxpayers generally rather than those who use the infrastructure. The shallow subsidy rate provided by SIBs, together with the explicit requirement that beneficiaries pay, would work to channel SIB subsidies to projects that were more likely to be self-supporting. Increased payments by beneficiaries would provide new revenues for further investment and better signals about where and how much new investment was needed.

- This initiative would provide new funding that could be used to support other Administration policies, such as efforts to address problems in urban areas.

Con

- Some believe that the requirements for leveraging and pricing would sharply limit the political appeal of this initiative.
- Undertaking this initiative would divert budgetary resources and political capital from other Administration priorities, such as health care reform or welfare reform.
- The Administration already has sought a limited "reinvention" of federal infrastructure programs through the programmatic reforms undertaken to date. More extensive reinvention efforts could be pursued in the context of routine reauthorizations.

- 1) copy for
2) private
- Although infrastructure spending has fallen short of what the Administration had hoped to achieve, it nonetheless has remained high relative to other priorities -- funding has been preserved and slightly increased at a time of severe budget constraints. Section I showed how the budgetary and programmatic efforts of this Administration have advanced the agenda of those who would invest more -- and more efficiently -- in America's infrastructure. Given the Administration's infrastructure achievements to date, and the severity of existing budget constraints, the limited available resources might be better spent on other Administration priorities.
 - Congress might not enact any of the programmatic reforms embodied in this option, but instead use proposed funding simply to increase spending on existing programs. Yet achieving programmatic reform would be one of the most important justifications for undertaking this initiative. Some agencies do not believe that an adequate case has been made for increasing spending on existing infrastructure programs.
 - The options considered in this memo would tend to focus spending on projects that can be justified on economic merit alone, and might give less weight to some of the distributional concerns that are reflected in current programs. Specific provisions might need to be added to the SIB proposal in order to address federal concerns about the distribution of SIB subsidies. For example, special provisions might be needed to insure that the subsidies addressed the infrastructure needs of economically troubled areas.

A UNRESOLVED DESIGN ISSUES. A number of issues remain open: project eligibility criteria; whether the SIBs should provide special treatment for "federal priorities," and whether the program should be mandatory or discretionary.

1. Project Eligibility -- all infrastructure or transportation only. A broad-based initiative would cover all transportation and water-supply facilities now eligible for federal aid. Such a program would address concerns about underinvestment in "public infrastructure" generally, and has the potential to generate the widest support among infrastructure advocates.

On the other hand, a broad-based initiative would run the greatest risk of being attacked as being unnecessary in a time of fiscal constraint. Moreover, unless the SIBs receive substantial resources, environmental advocates may want to focus all available resources on existing Clean Water SRFs, rather than have water projects compete for the same pot of money as transportation projects. Nor would limiting the SIBs to transportation projects necessarily sacrifice the support of environmentalists, for the conditions under which SIB subsidies would be made available are exactly those that environmentalists have championed for some time: relatively low matching rates, greater reliance on beneficiary pays, and increased private sector investment in infrastructure.

2. "Federal Priorities" Window -- SIBs would not be well-suited to address specific federal priorities. If desired, special provisions could be added to achieve various federal priorities. SIBs could be required to allocate a specified portion of subsidies: for projects in designated urban areas; for qualifying congestion relief projects; for projects addressing regional or interstate problems; and/or to make below-market loans to private entities that need to clean

up "brownfields." Adding such provisions would increase the likelihood that the SIBs furthered specific federal goals, but would reduce state flexibility and its attendant benefits.

3. Mandatory or Discretionary. Legislation establishing the SIBs could determine that federal capitalization grants were mandatory spending, discretionary spending, or both:

- A mandatory program could be paid for on a PAYGO basis. In addition, a mandatory program would provide more predictable funding streams, allowing better planning and more efficient resource use at the local level. Congressional oversight would be maintained through routine oversight hearings and the reauthorization process.
- A mandatory program might provide somewhat less Congressional oversight and afford Congress somewhat less control over federal revenues. In addition, designating such a program as "mandatory" would run the risk of opponents charging the Administration with trying to avoid the intent of the Budget Enforcement Act (opponents might charge that the Administration was using artificial categorization in order to use PAYGO offsets to fund spending that otherwise would be capped.)

IV. OTHER OPTIONS. None of the options below could provide an initiative of the scope and magnitude of SIB grants. At the same time, the options that follow might be attractive either as complements to a larger SIB initiative, or as a substitute for it should the Administration wish to pursue a smaller initiative.

A. CREATE A "TAXABLE INFRASTRUCTURE BOND". SIBs, or perhaps state and local governments generally, would receive a direct federal subsidy for a portion of the interest that they pay on taxable bonds issued to support specific classes of infrastructure projects. Taxable bonds would be attractive to SIBs if (1) the interest subsidy lowered borrowing costs below what they could achieve through tax-exempt borrowing, or (2) it were made available for projects that cannot now get tax-exempt financing, e.g., privately-owned roads and intermodal facilities.

The taxable bond interest subsidy would be a mandatory appropriation in order to allay issuer concerns that the subsidy might not continue for the life of the bond. The total subsidy paid out each year would be capped by limiting the amount of debt eligible for subsidy each year. The market for taxable bonds would encompass both those investors that currently invest in tax-exempt debt and those that do not now purchase tax-exempt bonds (e.g., pension funds and foreign investors). Bond volume would be allocated to states either on a per capita basis (a la the existing cap on tax-exempt, private activity bonds) or would be auctioned off by some federal entity.

Pro

- Would give SIBs another tool to subsidize state and local infrastructure investment. This option would have none of the economic inefficiencies associated with tax-exempt financing.
- Pension fund managers may support this option, for it would allow them to earn taxable returns on investment in public sector infrastructure.

Con

- All of the objections raised against Option 1 apply equally to this option.
- State and local officials and the tax-exempt bond industry would be likely to oppose the proposal strongly as a threat to the existing Federal subsidy for tax-exempt debt. Fierce opposition greeted a similar proposal by the Carter Administration. Some of the opposition to this instrument might be blunted by providing direct interest subsidies only for bonds issued by SIBs or only for projects that cannot now receive tax-exempt financing.
- Would divert resources from the basic option.

Other

- Much of the budgetary cost of taxable bond subsidies would take place outside the budget window. Unlike grants, which are scored as an up-front appropriation, the interest subsidy on a taxable bond would only require an appropriation each year equal to the amount of subsidy paid in that year.

B. CREATE A "TAX-CREDIT INFRASTRUCTURE BOND". This option would be similar to the taxable bond option in all but its budgetary effects. Under this option, SIBs would issue taxable bonds to support specific infrastructure projects. The holders of these bonds would receive a subsidy from the Federal government in the form of a non-refundable income tax credit (the value of the credit would be included in gross income). The total Federal subsidy would be capped by limiting the total amount of tax credit bonds that may be issued by a State.

Pros/Cons/Other -- same as taxable bond subsidies except that:

- Budget considerations -- unlike taxable bond subsidies, tax-credits would appear in the budget as a tax reduction rather than as direct spending.
- Political considerations -- Unlike taxable bonds, tax-credit bonds would not enjoy the support of pension funds (who would be unable to invest profitably in tax-credit bonds). On the other hand, tax-credit bonds would not carry the albatross of the words "taxable bond." Some agencies believe, however, that all those who oppose taxable bonds would equally oppose the substantively similar tax-credit bonds.

C. EXPAND TAX-EXEMPT BOND SUBSIDIES. State and local governments currently are able to finance public infrastructure projects with bonds that pay interest that is exempt from Federal income tax. Most infrastructure projects with significant **private** involvement, however, either cannot be financed with tax-exempt bonds or else can be so financed only if a portion of the relatively scarce State private activity bond volume cap is allocated to the project. Under this option, the Administration would seek to:

- provide a partial exemption from the state private-activity volume cap for certain infrastructure facilities;
- allow highways and intermodal facilities to be financed with private activity bonds.

Pro

- Tax-exempt bonds provide only a shallow subsidy. The value of tax-exempt financing varies with interest rate levels, individual and corporate income tax rates, and other factors affecting the tax-exempt market. At present, tax-exempt financing provides a subsidy that is economically equivalent to a direct grant for roughly 15–20 percent of a project's costs.
- Because these subsidies generally would benefit private investments, they would lead to facilities paid for by the beneficiaries rather than general taxpayers.
- Easing constraints on tax-exempt debt at the same time that a taxable bond option is proposed might reduce fears that the taxable bond was intended to undermine support for tax-exempt financing.

Con

- All of the objections raised against Option 1 apply equally to this option.
- Most economists believe that tax-exempt financing is inefficient, for the benefits of lower interest rates to issuers are smaller than the Federal revenue foregone through the grant of tax-exemption. A rough estimate suggests that state and local borrowing costs are reduced by about \$90 dollars for every \$100 in revenue that the federal government loses due to tax-exemption for municipal bonds.
- Would take money from the basic option.

Other

- The tax subsidies would be scored as revenue losses, rather than direct outlays. Unlike direct subsidies, which require an up-front appropriation of the present value of the subsidy being offered, tax-exempt bond subsidies would require budget resources equal to the annual loss from the increased use of tax-exempt debt during the budget window.

D. PROVIDE TAX SUBSIDIES FOR PRIVATE ENVIRONMENTAL FACILITIES. The Administration would seek two tax subsidies for private sector investors in wastewater treatment and drinking water facilities:

- accelerated depreciation (the depreciable life of this property would be reduced from the current levels of 15 or 20 years to a shorter period, e.g., 7 or 10 years).
- contributions in aid of construction (CIAC) — CIACs are contributions of capital assets or the cash equivalent made to investor-owned water utilities by new customers to reimburse the utility for the cost of improvements needed to serve the customer (e.g., the land developer). Current law includes the value of CIACs in a regulated utility's gross income subject to federal income tax. This option would allow utilities to exclude from gross income the value of CIACs if such contributions were also excluded from the utility's rate base.

Pro

- These changes would provide relatively shallow subsidies. The accelerated depreciation, for example, would provide a subsidy that was economically equivalent to a direct grant for something less than 5 percent of the amount of project costs. CIAC would provide a subsidy roughly on the order of 30 percent of capital costs.
- The CIAC change would provide incentives to consolidate small, public systems into larger, private systems. Larger systems may be more likely to comply with EPA regulations.

Con

- These proposals would effectively reinstate provisions of the Tax Code that were repealed in the 1982 Tax Act and the Tax Reform Act of 1986. In 1982, Congress repealed accelerated depreciation for these facilities, arguing that depreciable lives for income tax purposes should be at least somewhat tied to economically useful lives. Similarly, Congress decided in the Tax Reform Act of 1986 that CIACs should be treated for income tax purposes as compensation for a service provided. Supporting a reversal of the 1982 and 1986 decisions would make it more difficult to oppose other exceptions to what the Administration believes is good general tax policy.
- All of the objections raised against Option 1 apply equally to this option.
- Would take money from the basic option.

Other

- The budgetary cost of accelerated depreciation would be equal the annual difference between depreciation deductions under current rules and those under the proposed rules multiplied by the investors' marginal tax rates.

TAB A

PUBLIC INFRASTRUCTURE SPENDING

Table 1
Administration Budget Requests and Enacted Levels
for Major Infrastructure Categories
(\$ in billions)

	1993	1994 Request	1994 Enacted	1995 Request	1995 Enacted
Transportation	24.5	28.6	27.4	28.3	27.2
Highways _1/	(17.4)	(20.4)	(19.9)	(20.0)	(19.7)
Transit (capital)	(2.6)	(3.4)	(3.4)	(3.8)	(3.5)
Railroads	(.4)	(.4)	(0.4)	(0.5)	(0.5)
Air Transport	(4.1)	(4.4)	(3.7)	(4.0)	(3.5)
Water Treatment and Supply	3.0	2.5	3.0	3.2	3.4
Water Resource Development	2.2	1.9	2.2	1.6	1.7
Other / CDBG	0.8	0.8	0.9	0.9	0.9
Total	30.6	33.8	33.5	33.9	33.2

_1/ - excludes emergency spending

Infrastructure Spending Summary

The term "infrastructure" refers here to transportation, environmental, and water resources facilities. This definition corresponds to the role of infrastructure in supporting the national economy, and also to the areas in which the Federal government plays the largest role in project selection and funding.

Total Spending

Table 2 displays government spending on major infrastructure categories in 1990. Spending by all levels of government on all forms of infrastructure (including operations) totalled \$147 billion in 1990². Net of Federal grants, State and local governments spent \$110 billion, or 75% percent of this total.

² Congressional Budget Office, August 1993

Capital Spending

For 1990, about \$66 billion or 45% of total infrastructure spending was for capital purposes, the remainder was for operations and maintenance. The Federal government contributed \$26 billion or 40% of total spending. The vast majority (83% or \$21 billion) of this capital assistance was provided in the form of grants or loans.

Debt Financing

Much of the \$110 billion in State and local spending is financed with tax-exempt debt. In 1992, States and localities issued more than \$78 billion in infrastructure debt; total outstanding municipal debt was \$1.2 trillion at the end of 1992. The Federal tax exemption for interest on state and local debt provides a major subsidy to State and local infrastructure spending. In 1992, the Federal revenue loss from tax-exempt debt on infrastructure bonds totalled \$26 billion. Many State and local governments also exempt such debt from State and local taxes.

Table 2
1990 Capital Spending by All Levels of Government for Infrastructure
(\$ in billions - nominal \$)

	Total	Federal	State and Local	Federal as % of Total
Highways	34.3	13.9	20.4	41%
Transit	5.5	3.1	2.4	56%
Railroads	0.0	0.0	0.0	0%
Air Transport	4.8	2.6	2.2	54%
Water Transport	1.2	0.3	0.9	25%
Water Treatment and Supply	15.4	3.0	12.4	19%
Water Resource Development	4.7	2.8	1.9	60%
Total	65.9	25.7	40.2	39%

TAB B**Infrastructure Accomplishments & Outstanding Proposals****Department of Transportation****Budget Summary:**

- The Administration's budget requests have favored transportation programs: the FY 1995 budget sought an increase of 3 percent over FY 1994 levels and 15 percent over FY 1993 levels. The proposed spending would have supported "full-funding" of both federal-aid highways and formula grants for transit capital spending.

Other Accomplishments/Proposals:

- **Innovative Financing Initiative.** In March 1994, the Federal Highway Administration established an Innovative Financed - Test and Evaluation Project (TE-045) to help identify actions to encourage increased investment in transportation. Working with the States, FHWA has identified projects, developed a plan of finance and offered those projects as examples of creative financing solutions. With this initiative, FHWA hopes to de-mystify the financial options made available by ISTEA and Title 23. FHWA is clarifying for States what they can already do under current law. They are also making FHWA guidance more flexible so States can take advantage of what ISTEA or Title 23 permits. Twenty-six states have submitted a total of 60 innovative financing projects. FHWA will use the findings of this effort to examine the current operating and change regulations or guidance where there is administrative discretion. Where the results suggest that changing the statutory framework is necessary, the results will help shape future legislative proposals.
- **Implementation of E.O. 12893.** A Draft plan covering FHWA, FTA, FRA, FAA, and Coast Guard was submitted March 30, 1994, covering formula and discretionary grant programs of these agencies. Final plan to be submitted shortly and incorporates several of the items discussed below, especially **Infrastructure Investment Criteria**.
- **Infrastructure Investment Criteria** FHWA and FTA issued guidance for conducting the ISTEA-required major investment studies of significant transportation investments in metropolitan areas. FTA also issued criteria for funding of transit new start projects. FAA has developed criteria for award of airport discretionary grants, which include benefit-cost analysis for large projects, and for signing Letters of Intent to award future-year grant funds. As DOT grant recipients comply with these requirements, transportation decisionmakers will have better information to make informed decisions on proposed infrastructure investments.
- **Management and Monitoring Systems.** Interim Final Rule published in the **Federal Register** on December 1, 1993, implementing the ISTEA requirements for State

management systems for (1) highway pavement of Federal-aid highways, (2) bridges on and off Federal-aid highways, (3) highway safety, (4) traffic congestion, (5) public transportation facilities and equipment, and (6) intermodal transportation facilities and systems. These systems will enhance the States decision-making process for use of transportation funding.

- Statewide and Metropolitan Planning. Final rules published in the Federal Register on October 28, 1993, implementing the ISTEA requirements for revised statewide and metropolitan planning processes for the Federal highway and transit programs. These rules require a comprehensive approach to planning and programming transportation projects at the State and urbanized area levels that will improve the overall decision-making for funding transportation projects and assure that transportation projects help meet Clean Air Act air pollution improvement goals.
- Highway Life-Cycle Cost Analysis (LCCA). Interim policy statement published in the Federal Register on July 11, 1994, establishing LCCA principles to be applied by FHWA in its infrastructure analysis and in evaluating the adequacy of State highway agency procedures used for evaluating projects funded by the Federal-aid Highways program.
- Highway Economic Requirements System (HERS). The FHWA-developed HERS model is undergoing final internal and external review prior to being applied by FHWA in the development of the system-level highway "needs" report due to Congress in January 1995. The HERS model overlays an engineering-based needs model with an investment/performance model that incorporates benefit-cost analysis.
- Congestion Pricing. A cooperative agreement was signed in August 1993 with the California Department of Transportation and the Metropolitan Transportation Commission for the first project under the Congestion Pricing Pilot Program authorized by ISTEA. The program was funded with contract authority of \$25 million per year for FY 1992 through FY 1997. To expand opportunities for additional projects, the initial project solicitations have been extended indefinitely and criteria for acceptable projects have been refined. In addition, pre-project development studies have been made eligible for funding.
- National Highway System (NHS)/National Transportation System (NTS). The Department announced and submitted to Congress its NHS map and designation in December 1993. At the same time it started an effort to identify a National Transportation System. Both concepts are important for helping to set priorities for investment and for focusing the Nation's attention on an integrated transportation system designed to meet mobility and economic needs in the most cost-effective manner possible.
- Intelligent Vehicle-Highway Systems (IVHS). The IVHS program has moved aggressively to establish the structure and process by which the Department will make use of improvements in information infrastructure to promote more efficient use of the

physical infrastructure. Automated Highway developments along with operational tests and research and development have pushed the envelope on techniques to enhance highway/transit systems productivity. The program covers a whole range of diverse information and control technologies to make highway use safer and more efficient. Self-diagnostic sensors on, for example, "smart" bridges, report when a bridge needs repairs and can help target maintenance and renewal when it is most timely.

- Next Generation High-Speed Rail. The Department has developed a program that will support the advancement of high-speed rail, particularly on existing infrastructure. Proposed legislation -- which has passed both Houses of Congress -- would establish Federal programs to support both high-speed rail corridor planning and the development, testing and demonstration of high-speed technologies for application in existing rail corridors. The Department is working on a high-speed rail commercial feasibility study that will be used to support the development of a comprehensive national policy that will form the basis for establishing a long-range Federal role in high-speed ground transportation development.

Environmental Protection Agency

Budget Summary:

- The Administration's 1995 Budget requests for wastewater treatment and safe drinking facilities were up 5 percent from 1994 levels and up 7 percent from 1993 levels. (As part of NAFTA, the Administration sought \$116 million to capitalize the North American Development Bank, which will be instrumental in providing \$2 to \$3 billion in environmental infrastructure for the U.S.-Mexico border region.)

Other Accomplishments/Proposals:

- As noted in Section I.B., the Administration has proposed improving investment in the Nation's water infrastructure through reauthorization of the Safe Drinking Water and Clean Water Acts. The Administration's specific recommendations include the following:

Safe Drinking Water Act

- Increase flexibility for communities to meet SDWA requirements and better target resources to effective protection of the environment and public health;
- Extend eligibility for DW-SRF assistance to all public, non-profit, and private community water systems;
- Protect sources of drinking water to reduce the need for costly treatment infrastructure;
- Ensure the viability of small systems to maximize the Nation's investment in drinking water infrastructure;
- Establish treatment technology standards specific to small systems to lower the cost and increase the efficiency of systems unable to benefit from economies of scale;
- Implement a comprehensive system of operator training and certification to ensure efficient use of infrastructure;
- Increase flexibility for selecting drinking water contaminants to be regulated and for setting compliance time-frames to help control infrastructure costs;
- Streamline and strengthen the enforcement provisions of the SDWA to improve compliance with the law and to encourage needed investment in infrastructure.

Clean Water Act

To continue and extend the success of the Clean Water SRF program, the Administration proposed continuing Federal capitalization of the program through 2004 at a level sufficient to allow CW-SRFs to provide a least \$2 billion (in 1994 dollars) per year in assistance over the long term. The recommended authorizations are:

FY 1995 — \$2.00 billion
FY 1996 — \$2.00 billion
FY 1997 — \$2.00 billion

FY 1998 -- \$2.00 billion
FY 1999 -- \$1.50 billion
FY 2000 -- \$1.25 billion
FY 2001 -- \$1.00 billion
FY 2002 -- \$0.75 billion
FY 2003 -- \$0.50 billion
FY 2004 -- \$0.25 billion
Total -- \$13.25 billion

The Administration also made the following recommendations to better target Federal resources to critical projects and to provide flexibility to States and local governments in protecting and cleaning the Nation's waters:

- Expand the eligibility for CW-SRF assistance to include activities such as pollution prevention and water use efficiency that can reduce the need for costly treatment infrastructure;
- Remove restrictions on CW-SRF funding of combined sewer overflows, storm water controls, and sewer rehabilitation, which represent critical infrastructure needs for some communities;
- Remove certain Federal requirements for engineering and planning from assistance to small communities in order to reduce the cost burden of wastewater projects;
- Authorize States to provide additional subsidies to economically disadvantaged communities through the CW-SRF program with negative interest rate loans, principals write-downs, or similar mechanisms;
- Remove impediments to private investment in municipal wastewater facilities by defining the term "publicly-owned treatment works" in a manner that would ensure equitable permitting and enforcement for all public-purpose facilities, regardless of ownership structure (this provision would not extend eligibility for CW-SRF assistance to private wastewater entities).

Water Resources Infrastructure

[Army Corps of Engineers & Interior's Bureau of Reclamation]

Budget Summary:

- The Administration sought a decrease in water resource programs (e.g., dams, ports and harbors).

Other Accomplishments/Proposals:

- Prior to authorization for construction, water resources infrastructure projects must be evaluated for economical feasibility and environmental acceptability.
- The Army Corps of Engineers received more than \$1.7 billion in 1994 to continue work on about 160 projects. In 1994, the Bureau of Reclamation received about \$0.4 billion for various construction projects. The Bureau of Reclamation devoted substantial funds to the completion of its last multiple objective, water resources development (the Central Arizona Project). Funding enacted for water resources infrastructure investments decreased between 1994 and 1995.
- Consistent with E.O. 12893, Principles for Federal Infrastructure Investment, both the Corps and Bureau are making serious efforts to operate existing infrastructure more effectively and efficiently. In fact, the Corps entire operations and maintenance program (not part of the table of infrastructure investments) is included in its GRPA pilot project.

HUD's - Community Development Block Grant (CDBG) Program

CDBG funds can be used for a wide range of eligible activities related to housing, economic development, public services, and public works. Choice of which eligible activities to fund is made at the local level. Based on available information, about 20% of CDBG funding is used for infrastructure (i.e., street and sidewalk repairs, water, sewer, flood control, and drainage systems). Most CDBG funds are used for housing-related activities, construction of public buildings, economic development activities, and planning/administration.

Budget Summary:

- The Administration sought minor increases for HUD's Community Development Block Grants program related to infrastructure. About 20% of the CDBG program goes to "public works" type investments.

Other Accomplishments/Proposals:

HUD's FY 96 budget may include a new economic development proposal that would provide additional funding for infrastructure for distressed communities.

TAB C

Revise E.O. 12803, "Federal Interests in State and Local Infrastructure Investments."

The Working Group recommends that the Administration issue a revised Executive Order 12803. The Deputies will receive a separate decision memorandum outlining this recommendation in more detail.

Background

E.O. 12803 was issued by the previous Administration to encourage Federal, State and local governments to sell public investments in infrastructure. The order reduced federal recoupment requirements for the sale of existing assets, and instructed agencies to remove regulatory and other barriers to State and local sale of infrastructure assets that had been financed in part with federal funds.

Discussion

To date, no state or locality has taken advantage of the provisions of E.O. 12803. The revised order would be designed to end the uncertainty that has surrounded the current order and to encourage more private investment to supplement existing public investment in infrastructure. The proposed new Executive Order would: (1) remove elements of the current order that favor private sector ownership and operation over continued public ownership and operation; (2) limit the use of State and local proceeds to new or expanded infrastructure investment; (3) clarify the rules for disposing of federally-financed infrastructure; and (4) accommodate the Uniform Administrative Requirements for Grants and Cooperative Agreements to State and Local Governments or "Common Rule."

Tab D
National Infrastructure Corporation

Several groups have proposed creation of an off-budget "infrastructure bank" or National Infrastructure Corporation (NIC). Such an entity was envisioned, for example, in *Financing the Future*, the 1993 report of the Commission to Promote Investment in America's Infrastructure. Most recently, an NIC is the subject of H.R. 2150, the National Infrastructure Development Act of 1994.

Typically, an NIC would be a government-sponsored enterprise (GSE), capitalized in whole or in part with Federal funds, and with at least three branches and functions. First, an infrastructure insurance subsidiary (termed the Infrastructure Insurance Company or IIC in *Financing the Future*) would insure and reinsure certain taxable and tax-exempt senior infrastructure debt issues that other bond insurers will not handle. Its activities would be similar to those currently carried out by the GSE Connie Lee within the narrower college construction loan sector. Second, the NIC would use borrowed or appropriated funds to invest in senior or subordinated securities. Third, a development insurance service would provide insurance to infrastructure projects for the initial development stages, when financing may be difficult. An NIC could raise funds in several ways, including issuance of equity securities. In conjunction with establishing an NIC, *Financing the Future* and H.R. 2150 recommend creation of an infrastructure security for pension funds that could be distributed tax-free to participants at retirement.

The proposed IIC was modeled after the College Construction Loan Insurance Association (Connie Lee), an existing GSE, which is authorized to insure and reinsure certain academic facility bonds. Shortly after *Financing the Future* was released, Connie Lee proposed legislation to authorize it to insure and reinsure infrastructure bonds. On February 17, 1994, the Administration submitted legislation to Congress that would authorize Connie Lee to insure and reinsure elementary and secondary education bonds. No action has been taken on this legislation.

By lowering the hurdle rate of return necessary for an investment to acquire funding, the lending and insurance activities of an NIC would stimulate additional investment in infrastructure. As a GSE, it would also have some budgetary advantages over an on-budget program or corporation. Its equity and debt securities would be taxable, and therefore would facilitate infrastructure investment by pension funds. Finally, an NIC could in theory provide a vehicle for implementing a consistent and coherent infrastructure investment strategy, with an extensive role for public/private partnerships.

However, the Working Group does not support calls for an NIC. The Federal Government has generally opposed proposals for new or expanded GSEs because of concerns about increased taxpayer exposure, potential distortions of private credit markets, possible increases in Treasury borrowing costs, and potential misdirection of the Government subsidy.

One problem is that the earnings potential of an NIC is questionable. Without additional federal subsidies, it may not be able to overcome the problem of using taxable-rate debt and equity issues to finance the purchase of tax-exempt municipal infrastructure bonds. At the same time,

financing or insuring below-investment-grade issues would be risky, and few issuers might wish to pay the premiums required to make such NIC activities profitable.

The need for the NIC's insurance role is also questionable. The bond insurance market is very competitive and is growing rapidly. Although market imperfections may exist, there is no convincing evidence that inherently profitable investment opportunities cannot find private insurance. Private bond insurers would certainly object to what they would consider needless and unfair competition from a federally-backed GSE.

A GSE also has several disadvantages in terms of control and accountability. As a private corporation, its investment policy is outside the direct control of the government. Its activities would not be subject to explicit on-budget review concerning its ongoing effectiveness and justification in terms of current public policy priorities. Accrued changes in its net worth are not reflected in any federal accounts, but the government may be forced to recapitalize the NIC, at great cost, if it becomes insolvent. This implicit federal guarantee of the NIC's investors and creditors could create a moral hazard problem in which the NIC undertakes more risky investments than would an ordinary private company.

In response to an NIC's attraction as a focus for pension fund investments in infrastructure, many observers would point out that money is fungible. The fact that pension funds do not invest in tax-exempt securities does not necessarily limit the supply of funds to the tax-exempt market. The proposal for preferential tax treatment of withdrawals of pension investments in infrastructure securities is also problematic, and raises significant tax policy concerns. This incentive is insufficient to make tax-exempt bonds as attractive to pension funds as corporate bonds or other taxable-rate issues, even if returns from the latter could not be distributed tax-free. Relative to municipals, the taxable securities would have roughly the benefits of tax deferral; paying tax at the time of distribution will generally be preferable to accepting a lower, tax-exempt rate throughout the life of the investment.

Agwd
10/18/94

Task Force -
Info.
Infrastructure

CC:SSG
JBT

FINAL DRAFT

**Highlights of
National Information Infrastructure
Applications Activities**

A Report for the FY 1996 Budget Process

**Information Infrastructure Task Force
October 24, 1994**

Contents

Executive Summary	1
Introduction	2
Highlighted NII Initiatives	
Master Spreadsheet.....	5
Digital Libraries	
Overview of Application Area	7
Highlighted Initiatives.....	8
Spreadsheet.....	10
Education	
Overview of Application Area	11
Highlighted Initiatives.....	11
Spreadsheet.....	14
Electronic Commerce	
Overview of Application Area	16
Highlighted Initiatives.....	17
Spreadsheet.....	18
Environmental Monitoring and Natural Resources Management	
Overview of Application Area	19
Highlighted Initiatives.....	20
Spreadsheet.....	21
Government Services	
Overview of Application Area	22
Highlighted Initiatives.....	23
Spreadsheet.....	24
Health Care	
Overview of Application Area	26
Highlighted Initiatives.....	27
Spreadsheet.....	29
Manufacturing	
Overview of Application Area	30
Highlighted Initiatives.....	30
Spreadsheet.....	33
Transportation	
Overview of Application Area	34
Highlighted Initiatives.....	35
Spreadsheet.....	36

Executive Summary

This package of information has been prepared by the Information Infrastructure Task Force (IITF), the inter-agency team chaired by the Secretary of Commerce, which is implementing the President's action plan for developing, in partnership with the private sector, an advanced information infrastructure, the National Information Infrastructure (NII). Development of the NII has the potential to significantly improve the way people use information in their jobs and other aspects of their daily lives by bringing vast amounts of information and greatly improved services to virtually every citizen.

Private industry will be responsible for virtually every major facet of the NII and the information marketplace it creates. Nevertheless, the government will play an important role in this process by complementing and enhancing the benefits of the private sector initiatives. As Vice President Gore has observed, "Our goal is not to design the [information] market of the future. It is to provide the principles that shape the market. And it is to provide the rules governing this difficult transition to an open market for information. We are committed in that transition to protect the availability, affordability and diversity of information and information technology as market forces replace regulations and judicial models that are simply no longer appropriate."

Earlier this year, the Vice President asked the IITF to prepare a budget highlight of NII-related activities. In this, the first year of such an effort, the IITF has prepared this report to identify and illustrate what the Administration is doing to accelerate the development and deployment of NII applications. Since NII applications permeate so much of the government's activities, the IITF has not attempted to catalog the entirety of the government's involvement in the NII. Instead, the IITF has focused on illustrating where the government is committing its resources by describing key initiatives within each of eight application areas. This information is intended to help guide the FY 1996 budget decision-making process.

We have identified new initiatives proposed for inclusion in the FY 1996 Budget, as well as existing programs that are restructuring their efforts in a significant way. The primary goal is to provide a clear and compelling description of key efforts to accelerate NII applications, and to increase the profile of NII-related activities in the core programs of all agencies. This document provides an input to the FY 1996 budget process. We also hope, at an appropriate time, to publish a FY 1996 National Information Infrastructure Applications Highlights Report to inform the public of the scope and range of the Administration's NII investments and efforts.

Introduction

This FY 1996 National Information Infrastructure Applications Highlights Report is designed to highlight key initiatives necessary to support the Administration's goals in the development and deployment of applications of the National Information Infrastructure (NII). This report has been prepared by the Administration's Information Infrastructure Task Force (IITF), the inter-agency team coordinating the development and use of the NII among the various agencies across government.

As noted in the Administration's *Agenda for Action*, the NII will consist of (1) conduits, interconnected, interoperable telecommunications networks, (2) information appliances including computer systems, televisions, fax machines and telephones (3) software, information services, and information databases (e.g. "digital libraries"), and (4) trained people who can build, maintain, and operate these systems. In the future, the NII will enable all Americans to get the information they need, when they need it and where they need it, at an affordable price. Secretary of Commerce Ronald Brown notes that the NII and the information revolution will result in "a fundamental change in the way we work, the way we learn, and the way we communicate. Knowing how the Industrial Revolution permanently altered American life, we can only begin to imagine how we will be transformed by becoming an information society."

Private industry will be responsible for virtually every major facet of the NII and the information marketplace it creates. Private industry will build and manage the networks, provide the information tools and most of the information that travels the networks, and develop most of the applications that use the networks. But government remains a major influence on the NII. Government policies on telecommunications reform, universal service, open access, privacy, security, interoperability, and standards, to name a few, will help shape the way the NII develops. In his State of the Union Address, President Clinton set as a National goal connection of the Nation's classrooms, libraries, schools, and clinics to the information infrastructure by the year 2000. Government actions, such as regulatory changes and intellectual property protection can help remove barriers to critical social and commercial applications of the NII. The federal government will use the networks to provide more efficient delivery of information and services to citizens. Another important role for government is coordinating U.S. activities with those of other countries, so that a truly international marketplace for information products and services can develop. As the Vice President has said, we are on our way to building a Global Information Infrastructure. Internet pioneer Robert Kahn believes that "Without government involvement on an international basis, it is unlikely that a global information infrastructure will emerge" [R.E. Kahn, CACM, Vol. 37, Nr. 8 (Aug 1994)].

The White House formed the IITF to articulate and implement the Administration's vision for the NII. The task force consists of high-level representatives of the federal agencies that play a major role in the development and application of information and telecommunications technologies. Working together with the private sector, the participating agencies are developing comprehensive technology, telecommunications, and information policies and promoting applications that best meet the needs of both the agencies and the country. By helping build consensus on difficult policy issues, the IITF enables agencies to make and implement policy more quickly and effectively.

The IITF's Committee on Applications and Technology (CAT), chaired by Arati Prabhakar, Director of the National Institute of Standards and Technology, coordinates the Administration's efforts to develop, demonstrate, and promote applications of information technology in manufacturing, education, health care, government services, libraries, environmental monitoring, electronic commerce, and other applications. To determine tasks and priorities, the CAT draws on a wealth of contributions from the private sector. Individuals, companies, and professional societies contributed to issues papers, an inventory of NII applications, and two reports on application areas. In addition, a partnership between industry and government resulted in a highly successful conference in September 1994: "Breaking the Barriers to the National Information Infrastructure." Nearly all the products from these activities are available to the public electronically through the Internet, providing a demonstration of the way government publications can be delivered using the NII.

This report was prepared by the CAT for consideration by the IITF, to identify new initiatives as well as existing programs that are significant to the NII. The primary goals are to increase the profile of federal NII-related activities and to assist Administration policy makers in determining where federal spending is being used on NII-related application areas. Earlier this year, the Vice President asked the IITF to prepare a budget highlight of NII-related activities. On June 24, Ronald Brown, Secretary of Commerce and Chairman of the IITF, and Leon Panetta, then Director of the Office of Management and Budget, directed the IITF's Committee on Applications and Technology to lead the IITF's budget cross-cut process. To accomplish this task, the CAT drew on the broad-based participation of people from across the government. In July, the CAT identified eight NII applications as categories into which agency submissions would be organized. The eight application areas are digital libraries; education; electronic commerce; environmental monitoring and natural resources management; government services; health care; manufacturing; and transportation. We identified these as the core set of applications because there are significant public interests to be served by the application of advanced information and communication technologies in these arenas.

From the end of July through October, a team of CAT participants from several federal agencies reviewed information on over 370 programs and initiatives from 20 agencies and developed a framework for highlighting the Administration's NII-related efforts. Of these programs, approximately 25 projects were identified as interagency efforts.

In addition to these contributions, we have also received preliminary input from the National Science and Technology Council (NSTC) Research and Development Budget Cross-cut. Agencies' NII-related programs and initiatives that have been submitted for the NSTC R&D Budget Cross-cut are noted in each of the eight application areas. Within the NSTC, the High Performance Computing and Communications (HPCC) Program has an important role in the development of the NII. The newest element of the HPCC Program, the Information Infrastructure Technology and Applications component, builds on and expands the research goals of the existing HPCC components and will produce critical enabling technologies that support each of the eight application areas. For a more detailed representation of agencies' HPCC efforts, please refer to the HPCC FY 1996 Budget Notebook.

The culmination of this effort is represented in this report, which was reviewed by the IITF at its meeting on October 4, 1994. Each of the eight applications areas provides a summary description of existing federal efforts and specific information to highlight key initiatives. We have also created a spreadsheet that organizes all agency submissions into categories that reflect important issues or objectives for that application. Recognizing that a number of programs have contributions that span across application areas, the report lists programs and initiatives in each of the application areas where they have relevance.

Highlighted NII Initiatives

<i>Application Areas</i>	
Digital Libraries	
	Comprehensive Digital Library Initiatives (NASA, NSF, Library of Congress)
	New Technologies (DoE, NASA, NARA, NSF)
	Seamless Electronic Information Location and Access (DoC/Census, DoD/DISA, DoE, DoJ, DoL, NASA, SBA)
	Library Infrastructure Grants (USDA/RDA, Ed)
Education	
	Federal Leadership Activities (DoC/NOAA, EPA, NASA, NSF, and other agencies)
	Planning (Ed)
	Research and Development, Including Demonstrations (Ed, NASA, NEH, NSF)
	Deployment of Technology (USDA, USDA/RDA, USDA/REA, DoC/NTIA, Ed, DoL/OSHA, NEH)
	Professional Development (Ed, NASA, NEH)
Electronic Commerce	
	Development of Technology (DoC/NIST, DoE)
	Development of Standards (DoD/DISA, NASA)
	Development of Architectures (DoC/NIST, DoD/DISA, DoE, Treasury, GSA, SBA, VA)
	Development of Applications/Demonstrations (USDA, USDA/RDA, DoC/NIST, DoD/DISA, DoE, DHHS, DoL, Treasury, EPA, NASA, NSF, SBA, TVA, VA)
Environmental Monitoring and Natural Resources Management	
	Research and Modelling Programs (USDA/Forest Service, DoC/NOAA, DoE/Defense Programs, EPA, NASA)
	Information Access/Connectivity (USDA/Forest Service, DoC/NOAA, DoE, DoI/NBS, EPA, NASA, NSF, and other agencies)
	Data Standards and Interoperability (USDA, USDA/Forest Service, DoI/USGS, EPA)

Table continues on next page.

DRAFT

Highlighted NII Initiatives (cont'd)

Application Areas

Government Services

Information Access Projects (USDA, DoC, Ed, DHHS, DoI, DoJ, DoL, EPA, GSA, NASA, NEH, SBA, and other agencies)

National Performance Review Projects (USDA, DoC, DoD, DoE, DoJ, DHHS, DoL, Treasury, EPA, GSA, NARA, NEH, SBA, USPS, VA, and other agencies)

Service Delivery Projects (USDA, DHHS, HUD, DoI, DoL, NARA, VA, and other agencies)

Information Infrastructure Development (USDA, DoC, DoD, DoE, DHHS, HUD, DoI, DoJ, DoL, GSA, NASA, NARA, NEH, NSF, SBA, and other agencies)

Health Care

Health Care Access Programs (USDA/RDA, USDA/REA, DHHS/ACF, DHHS/HCFA, DHHS/NIH, DHHS/ORH, DHHS/PHS, NASA, VA)

Health Care Quality Programs (USDA/REA; DoE; DHHS: CDC, CRDL, HCFA, HSTAR, NHIC, NLM, ODPHP, SAMSHA, SSA; DoL; NASA)

Health Care Cost Containment Programs (DHHS/ACHPR, DHHS/HCFA, VA)

Infrastructure Investments Specific to Health (DoC/NIST, DHHS/NLM, NASA)

Manufacturing

Research and Development (DoC/NIST, DoE, NSF)

Deployment (USDA/RDA, DoC/NIST, DoE, NASA, TVA)

Education and Training (DoE)

Transportation

Intelligent Vehicle-Highway Systems IVHS, including APTS (DoT/FHWA, DoT/FTA, DoT/NHTSA)

Spatial Data and Reference Infrastructure (DoC/NOAA, DoT/FAA, NASA)

Mesoscale Weather Systems (DoT/FAA)

Air Traffic Management and Control (DoD, DoT/FAA, NASA)

Waterway Management & Vessel Traffic Systems (DoC/NOAA, DoD/ACE, DoT/MARAD, DoT/USCG)

DRAFT

Digital Libraries

I. Overview of Application Area

A "digital library" is a collection of electronically accessible recordings on various storage media, consisting of text, video, images, numerical tables, data observations, software, audio and image sequences (narrated films), and recursive continuations of these for access, retrieval, browsing, query and display. Digital library technology supports the vision of linking of these resources and making them available to the citizen from their home, office or mobile environment through the National Information Infrastructure (NII). The ability of digital libraries to store and share knowledge, history, and culture will be central to the success of the NII.

Digital library initiatives, which are taking place in almost every federal agency, will provide access to an improved flow of electronic government information and world-wide digitized resources, and provide long-term access to the records and expressions of culture and scholarship. They will help to ensure that information is accessible to all and prevent the formation of a society divided into information haves and "have-nots". Most important, digital libraries will revolutionize our education methodology, and allow all elements of our society from Pre K to post 75 the ability to assimilate information according to one's own associative interest and curiosity.

Existing barriers to achieving the digital library vision fall into the areas of technology, policy/standards and education. Technology is required to store, locate, browse, retrieve and distribute digital library information. Conversion technology is needed to digitize text and images which currently exist in a non-digital format. Standards and policy are needed to ensure that consistent strategies can be deployed when utilizing digital libraries. Training on how to use digital libraries on the NII and on how to incorporate these resources into the home and workplace to improve our quality of life and standard of living will be key to meeting the vision.

Digital library initiatives will help breakdown the technological barriers to achieving the digital library vision. Some agencies such as NASA and the National Science Foundation have established comprehensive digital library programs that are structured to meet the goals of the NII. These efforts involved substantial private sector as well as government investment.

Other federal agencies have targeted the development of specific technologies relevant to digital libraries. For example, NIST is developing a spoken natural language interface to libraries. Digital library efforts to provide seamless electronic location of and access to existing sources of federal information are the most prevalent. The Department of Energy (DoE) and NASA efforts to make their scientific and technical information available in digital format are representative of this type of effort.

Financial assistance to help today's libraries acquire the infrastructure necessary to embrace digital technologies is another area of federal investment which is key to the development of digital libraries. The Department of Education's Interlibrary Collaboration grants program is one model of this type of activity.

Within the digital libraries application, investment gaps were noted in the areas of training programs, standards and intellectual property rights, and digitization of text and images. Future investment in these areas is critical to realizing the digital library vision.

Digital Libraries

II. Highlighted Initiatives

Within the digital libraries application, investment gaps were noted in the areas of training programs, standards and intellectual property rights, and digitization of text and images. Future investment in these areas is critical to realizing the digital library vision.

For the purposes of the budget cross-cut, the Federal government's digital library initiatives have been grouped into four categories: Comprehensive Digital Library Initiatives; New Technologies and Information Products; Seamless Electronic Information Discovery and Access; and Library Infrastructure Grants. Within the category "Seamless Electronic Information Location and Access" there are subcategories for scientific and technical information, environmental data, software, business/economic information, and humanities information.

(1) Comprehensive Digital Library Initiatives. Both NASA and NSF established comprehensive, multi-year digital library initiatives during FY94 which are specifically targeted at achieving the NII goals for government action. As noted in his State of the Union Address, President Clinton set as a National goal connection of the Nation's classrooms, libraries, schools, and clinics to the information infrastructure by the year 2000. These initiatives encourage private sector participation and cost sharing in programs to promote technological innovation and new applications with regard to digital libraries on the NII. The NASA effort makes available a treasure of environmental and space science images by encouraging the access of remote sensing data products over the Internet and the projects involve broadcast TV, cable TV, industry, academia, K-12 schools, and museums. Areas of investigation address universal service and access, education, user interfaces, and intelligent searches. In addition, the NASA project reaches out to a much broader audience than ever addressed before on a regular basis (potentially millions of people over major TV networks nightly). The project also encourages the creation of new job opportunities and new industrial opportunities by bringing high-speed (ethernet capability) into homes and schools over standard cable TV channels at reasonable costs.

(2) New Technologies and Information Products. A number of agencies have focused on developing specific technologies related to digital libraries to further the goals of the NII. NIST is sponsoring research on a spoken natural language interface to digital libraries. The Department of Energy is developing digital library tools in their Digital SuperLab. The DoE Computer Incident Advisory Capability addresses information security issues, while their National Storage Lab seeks out new techniques for handling the massive storage requirements which are inherent in the NII vision. The DoD Intelligent Archive and the NASA Access Mechanism are technology projects seeking to advance the use of intelligent interfaces and agents for information retrieval.

(3) Seamless Electronic Information Location and Access. Digital library efforts to provide seamless electronic location of and access to existing sources of federal information are the most prevalent digital library applications currently being funded. These projects promote seamless, interactive access to government and other information. Initiatives in this area are addressing scientific and technical information, software, business/economic data, and humanities information. These projects will result in the enrichment and expansion of the knowledge base available via the NII.

Digital Libraries

II. Highlighted Initiatives (Continued)

(4) Library Infrastructure Grants. The role of libraries in the future will be to advocate and help provide information equity and universal access for the public. Libraries will continue to coordinate and facilitate preservation of records and expressions of the nation's intellectual and cultural life both in traditional and digital formats. Many libraries need financial assistance to help them acquire the infrastructure necessary to embrace digital technologies. The Department of Education's LSCA Title III Interlibrary Collaboration Grants and the Department of Agriculture's Community Facility Loans provide this assistance of this type.

Digital Libraries

Agency Contributions

Comprehensive Digital Library Initiatives

**Digital Library Projects (NASA, Library of Congress)

*Digital Library Project (NSF)

New Technologies

Computer Incident Advisory Capability (DoE)

Digital SuperLab (DoE)

Electronic Exchange of Full-text Documents (DoE)

Intelligent Archive (DoE)

National Storage Lab (DoE)

NASA Access Mechanism (NASA)

Archival Electronic Records Inspection and Control (AERIC) & Archival Preservation System (APS) (NARA)

Interactive Systems Program (NSF)

Seamless Electronic Information Location and Access

Scientific and Technical Information

Internet/NII Information Search Tools (DoE)

Information Locator Prototype (DoE)

Digital Library for Energy and the Environment (DoE)

Scientific Information Dissemination Project (DoE)

Combined DNA Index System (CODIS) (DoJ)

Computerized Information System (OCIS) (DoL)

NASA STI Program Infrastructure Upgrade (NASA)

National Technology Transfer Center (NASA)

Software

DISA Repository Systems (DoD/DISA)

NetLIB (DoE)

Repository-based Software Engineering Program (NASA)

SBA Software Clearinghouse (SBA)

Business/Economic

STAT-USA Data Dissemination (DoC/Census)

Humanities

Collaborative Projects Program (NEH)

Digital Information Evaluation (NEH)

Virtual Library Models (NEH)

Prototype Distribution of Cultural Materials through the NII (NEH)

Editions Program (NEH)

Archaeology Program (NEH)

Reference Materials Program (NEH)

Library Infrastructure Grants

Community Facility Loans (USDA/RDA)

LSCA Title III Interlibrary Collaboration Grants (Ed)

* Indicates initiative has been identified by the NSTC R&D Budget Cross-cut

**Although not formally part of the Administration's Budget Process, the Library of Congress wished to include this project for the report.

Education

I. Overview of Application Area

The National Information Infrastructure (NII) promises every business, government agency, hospital, home, library, and school in the nation access anywhere, anytime to voice, data, full-motion video, and multimedia applications. The impact of these capabilities on learning -- for children, advanced students, and lifelong learners -- will be substantial. When fully realized and available equitably in all learning sites, these technologies will support the transformation of education into an active, hands-on process that engages the minds and imaginations of all learners and fosters the promise of lifelong learning.

Through the use of these technologies and a national commitment to quality education, students of all ages and abilities will reach the highest standards of academic achievement. Students will be able to access multimedia electronic libraries and museums containing text, images, video, music, simulations, and instructional software. Teachers, engineers, business managers, and all knowledge workers will have available new methods of working and learning, and will collaborate and share ideas with one another.

Significant gaps in the Federal Government's investments exist in support for planning; research, development, and demonstration; technical assistance; and professional development. For planning, technical assistance, and professional development, more resources could effectively be used under existing authorities. In research, development, and demonstration, the most immediate need is for a more coherent and focused Federal investment. However, it must be noted that the bulk of investments needed to bring about the NII must come from state and local governments, which together provide 93% of K-12 education funds and the majority of support for education at other levels. As reflected in the Department of Education's Goals 2000 program, close cooperation between Federal, state and local education agencies will therefore be an essential element to the timely development of important educational applications.

II. Highlighted Initiatives

The Federal Government's current efforts that support the development of the NII for lifelong learning span at least six different agencies. For the purposes of this exercise, the Federal Government's efforts can be organized into five categories:

(1) Federal Leadership Activities. The Clinton Administration has made technology for education a policy priority. In his State of the Union Address, President Clinton set as a National goal connection of the Nation's classrooms, libraries, schools, and clinics to the information infrastructure by the year 2000. Both the Department of Education and the White House Office of Science and Technology Policy have focused new resources on providing leadership to the nation in this area. Components of this effort include the development of a long-range plan for technology in education, to be completed in FY 1995; conferences drawing together educators, private sector leaders, regulators, and others; development of better statistical information about current uses of telecommunications in K-12 schools; support for legislative and regulatory changes; and other activities.

Education

II. Highlighted Initiatives (Continued)

(2) Planning. The Clinton Administration's K-12 education policy focusses on providing support for state and local systemic education reform. New legislation provides support for states and communities to focus all activities on the achievement of high standards by learners.

Highlighted programs in this category include:

- ***Goals 2000: Educate America Act (Ed)***. This program represents the Administration's framework for education reform and is designed to provide resources to states and communities to develop and implement comprehensive education reforms that help all students reach high academic and occupational skill standards. In FY 1994, it provided grants for the integration of technology and information infrastructure into state education improvement plans. Grants in FY 1995 and successive years will support the implementation of state plans and the development of local plans.

(3) Research and Development. Five Federal agencies engage in research, development and demonstrations. Under this rubric are activities such as research on educational outcomes facilitated by technology; the development and testing of new software and applications; the development of network models in educational settings; and support for pilot projects that provide visible examples of success and failure and critical experience and evaluation data. Highlighted programs in this category include:

- ***Challenge Grants (Ed)***. The Department of Education will support grants to consortia that include school districts in high-poverty areas and other entities such as private sector firms, universities, and museums to develop technology-supported learning opportunities.
- ***Network Infrastructure for Education Program (NSF)***. As part of the Education and Human Resources Directorate's Education and Training contribution to the High Performance Computing and Communications (HPCC) Program, this initiative provides grants to alliances of academic institutions, school districts, professional societies, state agencies, and others concerned with education reform to complete policy studies and research, development and demonstration projects related to the role of electronic networks in support of reform education.

Education

II. Highlighted Initiatives (Continued)

(4) Deployment of Technology. Programs in the Departments of Commerce and Education support the deployment of communications and information technologies into learning settings. Highlighted programs in this category include:

- ***Title I (Ed).*** Title I of the Elementary and Secondary Education Act, previously known as Chapter 1, is the largest Federal education program, providing support for services to help over 6 million poor children and children in high-poverty areas learn to high standards in over 53,000 schools. Funds are distributed by formula according to student population and poverty statistics, and spending decisions are made at the school district level. A significant fraction of Title I dollars (approximately 15%) will support the acquisition of computers, software, and networking equipment to support instruction and administration.
- ***Technology Information Infrastructure Applications Program (TIIP) (DoC/NTIA).*** This program supports grants to non-profit entities, including schools and school districts, for the planning and construction of telecommunications networks for the provision of educational and other social services.

(5) Professional Development . The development of skills among the nation's educators -- including teachers, administrators, and instructors of all kinds -- is a major bottleneck for the development of the NII. New technology tools must become familiar to and accepted by the nation's educators. Professional development is costly and time-consuming; it takes as many as two years of experience with new equipment for teachers and instructors to become fluent users of new technology tools. Highlighted programs in this category include:

- ***Eisenhower Professional Development Program (Ed).*** This program will provide grants to states, school districts, and institutions of higher education to provide access to professional development that support state and local systemic reform efforts. It is anticipated that a significant share of these funds will support training related to instructional technology, networking, and distance learning.
- ***Regional Educational Technology Support and Professional Development Consortia (Ed).*** The Department of Education will support a system of regional educational technology support and professional development consortia, which assists states, school districts, and schools in the use of technology, including networks, and will provide professional development opportunities for educators.

Education

Agency Contributions
Federal Leadership Activities
Global Learning and Observation to Benefit the Environment (DoC/NOAA, NASA, NSF, EPA, and other agencies)
Planning
*Goals 2000: Educate America Act (Ed)
Regional Education Laboratories (Ed)
Research and Development, Including Demonstrations
Basic Research and Dissemination Authority -- Regional Education Labs (Ed)
Challenge Grants (Ed)
Dept. of Education Research Activities (Ed)
Fund for Improvement of Post Secondary Education (Ed)
Fund for Innovation in Education -- Computer-based Instruction and Teacher Networking Grants (Ed)
*National Institute on Disability and Rehabilitation Research (Ed)
Special Education -- Technology Applications (Ed)
Technology, Educational Media, and Materials Program (Ed)
Funds for Interactive Learning Centers (NEH)
Funds for Collaborative Projects Linking Institutions (NEH)
Leadership Opportunity in Science and Humanities Education (NEH)
Special Opportunities in Foreign Language Education Grants (NEH)
*K-12 Education Project (NASA)
*Education & Human Resources Directorate (MOSIS, Superquest, Networking Infrastructure for Education, etc.) (NSF)
Deployment of Technology
Distance and Community Learning from the Cooperative Extension Service (USDA)
Community Facility Loans (USDA/RDA)
Distance Learning-Medical Link Grant Program (USDA/REA)
Distance Learning-Medical Link Loan Program (USDA/REA)
Technical Assistance Program (USDA/REA)
TIIAP (DoC/NTIA)
New Elementary and Secondary Education Act Initiatives -- Consolidated ESEA Technical Assistance Centers (Ed)
Special Education Grants (Ed)
Star Schools (Ed)
*Technology-related Assistance for Individuals with Disabilities (Ed)
Title I (Ed)
OSHA Employee and Employer Education and Training (DoL/OSHA)
Equipment for Multimedia Exhibits (NEH)
Nebraska Plan to Link Rural-Urban Resources (NEH)

* Indicates initiative has been identified by the NSTC R&D Budget Cross-cut

Table continues on next page.

Education (cont'd)

Agency Contributions
Professional Development
*AskERIC Service (Ed)
Eisenhower Professional Development Program (Ed)
Gopher-FTP-WWW site (Ed)
Regional Educational Technology Support and Professional Development Consortia (Ed)
Spacelink (NASA)
Division of Education Programs (NEH)
Expanded Exemplary Award Program (NEH)
Funds for Professional Development (NEH)
Division of Fellowship and Seminars (NEH)
Teaching with Technology Initiative (NEH)

* Indicates initiative has been identified by the NSTC R&D Budget Cross-cut

Electronic Commerce

I. Overview of Application Area

The vision of Electronic Commerce is to enable U.S. companies to increase productivity and adaptability to changing markets. Electronic Commerce will provide an integrated collection of low-cost, reliable services to handle tremendous volumes of business and technical transactions and to amass, analyze, and control large quantities of data. Organizations will be able to improve efficiency and accuracy, and reduce costs, while providing faster, more reliable, and more convenient services. U.S. companies will be able to reengineer their business processes, and then use the National Information Infrastructure (NII) to realize the productivity potential of their current and future information technology investments. Smaller firms will be able to enter and participate at lower cost and with greater efficiency in new markets, and larger firms will be able to evaluate, select, and more readily work with other companies. New ways of doing business and new forms of economic activities will become commonplace, including telecommuting, global sourcing arrangements, new training and education capabilities, and disaggregated alliances or networks of companies.

Electronic Commerce will provide the services to achieve this vision by integrating communications, data management, and security services, to allow business applications within different organizations to automatically interchange information. Communications services transfer the information from the originator to the recipient, according to formats defined by the data management services. Security services authenticate the source of information, verify the integrity of the information received by the recipient, prevent disclosure of the information to unauthorized users, and verify that the information was received by the intended recipient. Electronic Commerce applies and integrates these infrastructure services to support business applications such as electronic bidding, ordering and payments, and exchange of digital product specifications and design data.

Many companies and government agencies use Electronic Commerce to facilitate internal operations and interact seamlessly with their trading partners, but they usually require highly structured, previously established agreements on communications, data formats, and security. The resulting costs and lead times create economic barriers to widespread use of Electronic Commerce applications by small and medium-sized companies. Other barriers to Electronic Commerce include real or potential problems with scalability, interoperability, and ease of use. Developing and implementing Electronic Commerce is a top priority throughout the Federal Government, but many public and private investments are concentrated on short-range payoff. There is insufficient long-range investment in the standards and technologies needed by industry to develop the next generation of Electronic Commerce. For example, collaborative engineering and agile manufacturing may require high volumes of very complex data. High-speed communications, transaction management, and the management of many interrelated versions of data are needed to support these requirements, and to seamlessly integrate research, design, engineering, production, marketing, and sales.

Electronic Commerce

II. Highlighted Initiatives

The Electronic Commerce spreadsheet is divided into the following sub-categories:

- (1) Development of Technologies.** Initiatives in this category focus on developing and improving communications, data management and security services.
- (2) Development of Standards.** Initiatives in this category focus on developing standards for the content and structure of Electronic Commerce transactions, or standards for the supporting technologies.
- (3) Development of Architectures.** Initiatives in this category focus on interacting and combining standards and technologies to form complete Electronic Commerce systems. An important element of the development of new architectures is the Administration's Federal Electronic Commerce Acquisition Team (FECAT). FECAT is defining the Electronic Commerce architecture called for in the President's Executive Memorandum of October 26, 1993 on "Streamlining Procurement Through Electronic Commerce." The Memorandum directs the head of each executive department or agency to ensure that budgetary resources are available for electronic commerce implementation in each respective department or agency.
- (4) Developing Applications/Demonstrations.** These programs focus on a specific application of Electronic Commerce, demonstrating the value or feasibility of a particular Electronic Commerce architecture.

Electronic Commerce

Agency Contributions
Development of Technology
Federal Public Key Infrastructure Pilot Program (DoC/NIST)
Electronic Component Development (DoE)
Development of Standards
Defense Message System (DoD/DISA)
Digital Signature and Security Services System (NASA)
Development of Architectures
Electronic Billing and Payment for the Manufacturing Industry (DoC/NIST, DoE, Treasury)
Technical Architecture Framework for Information Management (DoD/DISA)
Electronic Acquisitions (GSA, VA)
Infrastructure Security Projects (DoD/DISA, DoE, SBA)
Development of Applications/Demonstrations
Rural Business Enterprise Grants Program (USDA/RDA)
Electronic Commerce & Electronic Data Interchange Projects (USDA, DoD/DISA, DoE, EPA, DHHS, DoL, NSF, VA)
TECNET network and database (DoC/NIST, DoE)
Electronic Proposal Project (DoE)
AMTEX - Demand Activated Manufacturing programs (DoE)
CALS Roadmap 2000 (DoE)
Open Systems Laboratory (DoE)
Electronic Data Interchange for Selected Industry Sector Reporting (EPA)
Postal Electronic Commerce Services (NASA)
International Trade Data System (Treasury)
Technology 2020 (TVA, DoE)
**Electronic Copyright/Management System (ECMS) (Library of Congress)

**Although not formally part of the Administration's Budget Process, the Library of Congress wished to include this project for the report.

Environmental Monitoring and Natural Resources Management

I. Overview of Application Area

Just as we monitor industrial output, consumption of goods and services and other indicators of economic health, so must we monitor environmental indicators to judge the state of the environment. An improved National Information Infrastructure (NII) will allow for the development of a nationally integrated network of observing systems, computational centers, archives, libraries and information dissemination systems to address the Nation's needs for environmental data and information. Such an infrastructure will serve as an enabling integrating agent for diverse observational data and information by building upon the national investment (both public and private) in environmental monitoring, protection, and natural resources management activities.

Past and current environmental monitoring have proven highly effective for collecting and processing large quantities of environmental data. However, the ability to perform comprehensive environmental monitoring currently is limited in two critical areas. First, the infrastructure for data collection and analysis is extremely fragmented. This limits the capacity to provide timely access to data and/or information in standard formats. Secondly, there is a lack of information tools to make detailed, comprehensive environmental measurements, and then to integrate and interpret them in support of a host of scientific, policy and operational uses. Raw data needs to be converted into useful information which conveys the multi-disciplinary nature and interconnectedness of environmental factors, thus providing a framework for improved policy and investment decisions.

The nationally integrated networks and tools proposed for development under the NII agenda will permit analysts, scientists, policy makers and the general public to have better access to more reliable information. Measurable progress in this regard will be observed in several areas: (1) reduced time to assemble environmental information for emergency action; (2) enhanced ability to locate and retrieve comprehensive, up-to-date, critical data for economic analysis and environmental policy considerations; (3) improved quality of environmental research, due to improved access to multiple agency databases; and (4) enhanced enforcement of government regulation for pollution control and natural resource utilization. There is the additional benefit that environmental information will be made more transparent, allowing both the public and policymakers to better track the economic benefits of annual investments in environmental observation and protection.

Environmental Monitoring and Natural Resources Management

II. Highlighted Initiatives

The programs highlighted for environmental monitoring and natural resources management activities promote the goals of environmental research and modeling, information access/connectivity, and interoperability of heterogeneous information systems. Critical to achieving these goals is the role of the High Performance Computing and Communications (HPCC) Program. Technologies developed by HPCC participating agencies and others will provide new algorithms; computational and information processing tools; transport mechanisms; and data translation services to support the environmental monitoring and natural resources management applications of the NII.

(1) Environmental Research and Modeling. The US Global Change Research Program, which involves academia, the private sector and most US agencies with environmental programs, consists of research activities that involve deployment of a number of new environmental observing systems. The networking component of this program is embodied in the Global Change Data and Information System (GCDIS), which is intended to provide the appropriate level of communications technology, interoperability, and connectivity to allow easy exchange of data among participating agencies. Other smaller projects are also being undertaken to support research applications with environmental monitoring data.

(2) Information Access/Connectivity. The Federal Geographic Data Committee (FGDC) has as its goal the creation of a national digital geographic information resource, known as the National Spatial Data Infrastructure (NSDI). The scope of the NSDI includes all geographic or "spatial" data including climatic, demographic, natural resource, oceanographic, and geophysical data. The GCDIS, mentioned above, plans to develop network interconnectivity, interagency gateways, and establish procedures and policies for global change data and information dissemination among the participating agencies. Other initiatives include projects for increasing access to energy efficiency and renewable energy information available via the Internet. This information, which includes databases, bulletin board systems, on-line catalogs, and lists of manufacturers and vendors, will assist state governments in implementing provisions of the Energy Policy Act of 1992 and voluntary initiatives of the Climate Change Action Plan.

(3) Standards and Interoperability. The issue of common standards and/or interoperability is a central component to most of the highlighted initiatives. The FGDC has taken a lead role in the development of data content exchange and metadata standards needed to implement the NSDI. The primary focus of the GCDIS is to establish and maintain effective mechanisms to integrate the disparate elements of global change information and data. Current plans call for the adoption of common standards for data exchange.

Environmental Monitoring and Natural Resources Management

Agency Contributions

Environmental Research and Modelling Programs

Infrastructure Project (USDA/Forest Service)
 Eastside Ecosystem Management Program (USDA/Forest Service)
 Resource Management Applications Program (USDA/Forest Service)
 Satellite Active Archive for on-line environmental satellite imagery dissemination (DoC/NOAA)
 MOSIAC implementation on environmental information dissemination systems (DoC/NOAA)
 Support Seasonal Forecasting (DoC/NOAA)
 *Geophysical Fluid Dynamics Laboratory atmospheric and oceanic modelling (DoC/NOAA)
 *Support for National Meteorological Center (NMC) (DoC/NOAA)
 Distributed Generation and Use of a Synthetic 3D Seismic Dataset (DoE/Defense Programs)
 NII Accessibility for Independent Gas and Oil Producers (DoE/Defense Programs)
 Clean Water Act, Section 305 (b) (EPA)
 Information Collection Rule (EPA)
 Remote Sensing Databases (NASA)

Information Access/Connectivity

Natural Resource Data Management and Dissemination (NSDI) (USDA/Forest Service)
 Base Network Connectivity (DoC/NOAA)
 Interagency National Environmental Index (DoC/NOAA)
 Management and Dissemination of Weather Data in Near-real-time (DoC/NOAA)
 Global Learning and Observation to Benefit the Environment (DoC/NOAA, NASA, NSF, EPA, and other agencies)
 *Information Dissemination Activities (DoC/NOAA)
 Digital Library for Energy and the Environment (DoE)
 Energy Efficiency and Renewable Energy -- The Energy Efficiency and Renewable Energy Network (DoE)
 Energy Efficiency and Renewable Energy -- FEMP Electronic Superhighway (DoE)
 Energy Information Highway Program (DoE)
 Development of Safe Drinking Water Information System (EPA)
 Inventory and Reporting of Chemical Usage (EPA)
 TRI Information Systems (EPA)
 Support for Enforcement Targeting, Tracking, and Compliance Activities, including FFIS, FFIS, and FAHWCD (EPA)
 Support for IDEA to Analyze and Develop Enforcement Targeting Possibilities (EPA)
 Second Phase of Technology Transfer Network (EPA)
 Electronic Review and Revision System for SIPS (EPA)
 Public Access Efforts (EPA)
 National Biological Survey (NBS) / National Biological Information Infrastructure - NBII (DoI/NBS)
 Earth Observing System (EOS) Program Digital Library and Data & Information System (NASA)
 Global Meteorological Satellites (GMS) Online (NASA)

Data Standards and Interoperability

Resources Management Applications Program (USDA/Forest Service)
 NSDI - Environmental Data - Soil Conservation Service (USDA)
 NSDI - Orthophotography and Digitized Soils Maps - Soil Conservation Service (USDA)
 Common Survey Data Structure Project (USDA/Forest Service)
 Data Integration and Management efforts (EPA)
 Modernization of STORET National Water Quality System (EPA)
 Development of Environmental Information Acquisition and Architecture (EPA)
 Standardization of Key Information Identifiers (EPA)
 US Geological Survey / National Spatial Data Infrastructure - NSDI (DoI/USGS)

* Indicates initiative has been identified by the NSTC R&D Budget Cross-cut

Government Services

I. Overview of Application Area

Today, the use of information technology (IT) can create a government that overcomes the barriers of time and distance to perform the business of government and provide information and services to the public. Information technology can swiftly be employed to transfer funds, answer questions, collect and validate data and keep information flowing smoothly within and outside government. In an electronic world, high speed information links will carry the data necessary to support government operations. The development of this infrastructure will enable the creation of "virtual agencies" which will allow citizens access to integrated program information and services.

The National Performance Review (NPR) has been an important element of the Administration's efforts to improve the delivery of government services. In the NPR report, Vice President Al Gore recommended an executive order to create a customer driven government. The President signed this order on September 7, 1993 and set a standard for government services to equal the best in business.

The NPR's Reengineering Through Information Technology team noted that customers of government services often find dealing with the Federal bureaucracy to be complicated, slow, and confusing. Uncoordinated, cumbersome, paper based delivery of government services further complicates the customers' efforts. To address this problem, the NPR IT report outlined a three part agenda for spreading information technology's benefits to the Federal Government: (1) strength leadership in information technology, (2) implement electronic government, and (3) establish support mechanisms for "electronic government." The NII initiatives highlighted below will help accelerate the Administration's move towards "electronic government."

II. Highlighted Initiatives

NII programs fund the development of information systems and support services in the following five categories:

(1) Proposed Information Access. Information access programs will improve public access to government information by allowing agencies to make such information available electronically. These investments include the National Telecommunications and Information Administration's (NTIA) Technology Information Infrastructure Applications Program (TIIAP), which fund competitively-selected matching grants to connect other governments, public institutions, and non-profit entities to existing networks. These grants provide seed money for organizations that normally would not have access to government computer networks and information sources.

Government Services

II. Highlighted Initiatives (Continued)

(2) Proposed Implementation of National Performance Review (NPR). Implementation of the Administration's NPR information technology recommendations will provide the necessary investments to move towards "electronic government." Projects include investments to establish an electronic mail address directory for the entire Federal Government; reduce the burden on employers of filing wage and tax data by sharing information among States and the IRS; create multi-agency electronic benefits transfer (EBT) for payment of government assistance services; and speed import/export processing while providing integrated trade data to policy makers. Investments in agencies' existing information infrastructure will make agency connectivity a reality.

(3) Proposed Investments in Service Delivery This category encompasses programs that will use information technology to deliver services such as loans, benefits, and grants directly to the public. These investments build on some HPCC research, including voice and signature recognition, to bring the benefits of Federally-sponsored R&D into the lives of Americans on an everyday basis. Benefits from these proposed investments include improving the timeliness of service delivery, making government services more readily available to the public through electronic means, and allowing the use of electronic filing of information collections wherever possible.

(4) Proposed Initiatives Supporting General Information Infrastructure Development.

As the Federal Government moves closer to an "electronic government," the agencies will need to provide upgrades to their existing communications networks. This category captures a broad range of agency initiatives that will enhance the existing telecommunications backbone to assist in the development of employee bulletin board systems and local and wide area networks. This category also includes programs that will accelerate critical NII enabling technologies and provide direct funding and loans for telecommunications and computer network infrastructure enhancements in both the public and private sector.

Government Services

Agency Contributions

Information Access Projects

Electronic Information Delivery at the National Agriculture Library (USDA/NAL)
National Agriculture Statistics (USDA/NASD)
NSDI Environmental Data - digitization and increased access (USDA/SCS, interagency)
STAT-USA Data Dissemination (DoC/Census)
Information Infrastructure Grant Program (DoC/NTIA)
Office of Defense Conversion (DoC/EDA)
Patent and Trademark Information On-line (DoC/PTO)
Libraries, Dissemination, and Distance Learning (Ed)
Agency Implementations of the Recommendations of the Electronic Mail Task Force (Government-wide)
Electronic Research Administration Program for the Management of Grants (DHHS/NIH)
Reengineered Disability System (DHHS/SSA)
Federal Geographic Data Committee - National Geospatial Data Clearinghouse (DoI)
National Biological Survey (NBS) / National Biological Information Infrastructure (DoI)
Agency Implementation of the Government Information Locator Service - GILS (DoI, interagency)
Combined DNA Index System (CODIS) (DoJ/FBI)
Freedom of Information and Privacy Act Document Processing System Project (DoJ/FBI)
Access to IMIS Information (DoL, EPA)
Training Technology Resource Center (DoL)
Employment and Training Administration - Training Technology Resource Center (DoL)
OSHA - Access to Integrated Management Information System Information (DoL/OSHA)
Data Integration and Public Access Efforts (EPA)
Clearinghouse on Computer Accommodation - IT Accommodation and Accessibility (GSA)
National Technology Transfer Center (NTTC) Gateway and Resource Center (NASA)
Division of Public Programs: A National Conversation on American Pluralism and Identity (NEH)
Export Assistance (SBA)
Business Information Centers (SBA)

National Performance Review Projects

Plan for the Effective Use of IT Throughout Government - Support of GITS, E-mail, etc. (DoE, GSA)
Electronic Benefit Transfer (USDA, DHHS, Treasury)
Coordinate, Recommend, and Implement IT Initiatives to Improve Customer Service (EPA, GSA)
Work with Private Industry to Advance the Implementation of IT to Provide Citizen Access to Government (GSA)
One-stop 800 Number Calling Service (DoE, DHHS/SSA, GSA, DoL, Treasury)
Implement an Integrated, One-stop Government Services Kiosk (DHHS/SSA, DoJ/INS, Treasury, GSA, USPS, VA)
Implement an Integrated, One-stop On-line Service (DoE, DHHS, DoL, GSA, NEH, SBA, NARA)
National Law Enforcement / Public Safety Network (USDA, DoJ/FBI, Treasury)
Intergovernmental Tax Filing (DHHS/SSA, Treasury/IRS)
International Trade Data Index (Treasury/Customs)
National Environmental Data Index (DoC/NOAA)
E-mail Networks and Support (DoE, DoL/OSHA, DHHS, GSA, SBA)
Telecommunications & Post-FTS2000 Environment (DoD/DISA, GSA)
Consolidate and Modernize Government Data Processing Centers (DHHS, DoL, Treasury)
Reengineer Basic Systems for Improved Delivery of Government Services (GSA, Treasury)
Consolidate and Integrate Federal Government Private Networks (GSA, Treasury)
Ensure Network System Privacy and Security (DoC, DoD/DISA, DoD/NSA, DoE, DoJ, GSA, SBA)
Provide Training and Technical Assistance in IT to Federal Employees (USDA, DoD/DISA, DoL, GSA, NEH)

Table continues on next page.

Government Services (cont'd)

Agency Contributions
Service Delivery Projects
InfoShare (USDA)
Medical Transaction System Initiative (DHHS/HCFA)
Reengineering Disability System (DHHS/SSA)
Social Security Automation Investments (DHHS/SSA)
Submission Management and Review Tracking (SMART) Program (DHHS/FDA)
Integrated Disbursement and Information System (HUD)
Electronic Submission of Single Family Claims (HUD)
Automated Land and Mineral Record System - ALMERS (DoI/BLM)
Implementation of "CSHO 2000" Project and Development of Electronic Reference Materials (DoL/OSHA)
Technological Innovation and New Applications (DoL)
Archival Information Infrastructure (NARA)
VBA Modernization (VA/VBA)
Initiatives Supporting General Information Infrastructure Development
Rural Telecommunications Loans (USDA/REA)
Rural Telecommunications Partnership Loans (USDA/REA)
Rural Business Enterprise Grants (USDA/RDA)
Rural Telephone Bank (USDA/REA)
Telecommunications and Information Infrastructure (USDA)
Americorps Program (USDA)
Advanced Technology Program -- Component Based Software (DoC/NIST)
Defense Information Systems Network (DISN) (DoD/DISA)
Office of the Future Pilot (DoE, DoD, DHHS, NASA, NSF)
*Exploration of High Speed Networking Technologies (DoE/Human Resources, DoE/Defense Programs)
eXperimental University NETwork (XUNET) (DoE)
*ARIES Testbed (DoE)
Electronic Component Development (DoE)
Interbank Check Image (DoE)
Automation Investment Fund (DHHS/SSA)
Integrated Disbursement and Information System (HUD)
Minerals Management Service (MMS) / Wide Area Network (DoI/MMS)
National Park Service (NPS) / ParkNet II (DoI/NPS)
Automation and Data Sharing Initiatives (DoJ/DEA, DoJ/FBI, DoL)
Office of the American Workplace BBS (DoL)
Integrated Management Information System (DoL/OSHA)
Local/Wide Area Network Deployment (DoE/Defense Programs, DHHS/SSA, DoI, DoL, NARA, SBA)
Implement Federal/State/Local Information Infrastructure Pilot (GSA)
Preservation and Dissemination of Humanities Resources (NEH)
Research on New Technologies for the NII (NSF)
Research Infrastructure (NSF)
Multi-disciplinary Challenges (NSF)
Computational Science and Engineering Applications (NSF)
NSFNet (NSF)
Supercomputer Centers (NSF)
Project ACCESS (SBA)

* Indicates initiative has been identified by the NSTC R&D Budget Cross-cut

Health Care

I. Overview of Application Area

National, state and local debate over the past year highlights the importance of health as a National Information Infrastructure (NII) application area. The goals of health care reform are to improve quality, expand access and contain costs. Health expenditures constitute a large and growing proportion of the Nation's economy. Applications such as automated claims and payment transactions, telemedicine, on-line access to clinical records, and on-line access to the latest treatment and prevention information, will help advance the health reform goals in fundamental ways.

Today's health sector, although information intensive, has not capitalized on computers and information networks as have other market sectors. Computers have been used in individual care settings and have begun to improve billing and claims transactions, but most clinical systems are not interoperable and patient information is created and re-entered numerous times. In addition, without easy communication among researchers, providers and consumers, new discoveries on prevention and care are not readily or rapidly disseminated.

Private and public sector interests in health care, health insurance, and health promotion have all begun to invest in and explore the many opportunities for the NII to improve health. Many of these initiatives show significant promise, but examine new, and as yet unproven, applications. In addition, some of the fundamental infrastructure needed to support broad implementation of new applications is lacking, most notably data exchange and content standards, such as those for medical records. The public comments on the draft health applications paper in "Putting the Information Infrastructure to Work" indicated strong support for Federal Government involvement in facilitating the NII and its health applications, in partnership with private sector efforts.

The Federal Government is both a provider and user of the many health applications the NII supports. Many of the existing National Library of Medicine (NLM) High Performance Computing and Communication (HPCC) projects represent important research and development initiatives in health. The Federal Government has also been involved in a number of key investment areas, including telemedicine, standards, increased public access to health information, and research and demonstrations projects that support health specific information infrastructure.

Current and planned Federal investments cover most of the important aspects of health applications, with a few exceptions. The most visible and perhaps biggest public concerns regarding health applications involve privacy and security. There is little Federal investment specific to health care regarding these concerns, probably because these concerns are better met by policies rather than investments. In the absence of legislation, health specific privacy and security guidelines should be pursued. Second, the uncertainty of health applications and the extreme pressure to contain health care costs, support a greater Federal role in evaluation of applications. Evaluation requirements will become an increasingly critical component in funded projects. Finally, increased government support is needed to expedite private initiatives for consensus standards development.

Health Care

II. Highlighted Initiatives

The programs highlighted for health applications promote four goals, three of which are the goals of health care reform, i.e., access, quality, and cost containment. The fourth goal is development of the supporting infrastructure that will facilitate linkages among the applications supporting the health goals.

(1) Access to Care. Highlighted projects supporting increased access to health care are telemedicine and health-oriented community network investments. The Office of Rural Health, Health Care Finance Administration (HCFA), the National Institutes of Health, and the National Aeronautics and Space Administration (NASA) are all investing in telemedicine projects that will increase access to care for remote areas nationally, and in the case of NASA's project, internationally. These projects also advance the NII goals of extending the universal service concept. The Administration for Children and Families (ACF) and Public Health Service (PHS) have invested in a project called the Community Services Work Station. This project provides a community network that links a broad array of health and social services to provide enhanced information and access to services regardless of where an individual initially comes for help. The workstation demonstrates the value the NII can bring to a community for health and other purposes. This project will extend the universal service concept and will help coordinate policies and approaches among levels of government, in this case local, state and Federal.

(2) Quality. Highlighted projects supporting improved quality of health care include the access projects already discussed, because increased access to care by its very nature can improve care. Also important are the many Federal initiatives to increase the public's access to health information and comparable initiatives to give providers access to patient information and the constantly expanding health research knowledge base. Although the individual projects are too numerous and to be identified individually, the crosscut highlights the broad array of such projects. For example public access projects include: the Directory of Information Resources Online (DIRLINE), the Physician Data Query (PDQ), AIDSLINE, AIDSTRIAL, AIDS DRUG, HSTAT, the Health Care Financing Administration's on-line project, the National Health Information Center, and 1-800 lines that service the same information links but without computer access. Provider patient care information and knowledge base projects include: Rural Extension Administration's Distant Learning Medical Link; NLM and the Agency for Health Care Policy and Research computer-based patient record initiatives; DoE's GRAIL program, NLM medical connections program; and, high performance communications for PDQ, Cancernet and electronic publishing as well as the current PDQ and HSTAT on-line services for providers. The CDC INPHO and WONDER projects also provide an integrated network for public health officials and an interactive information system for state, local, and academic health professionals respectively. Both the INPHO and WONDER will improve the accessibility and exchange of health promotion and disease prevention related information. All of these projects advance the NII goals of providing access to government information and furthering the universal service concept.

Health Care

II. Highlighted Initiatives (Continued)

(3) Cost Containment. The projects supporting health care cost containment include the information access and quality projects already discussed that will help consumers and providers know more about prevention and appropriate care. Highlighted cost containment projects include Federal investments in health data exchange and content standards and administrative streamlining applications. Within HHS, HCFA and the Agency for Health Care and Policy Research both have investments in standards development. Standards are recognized as the linchpin for the coordinated development and implementation of health applications. Standards are critical to create greater certainty for applications investments and support improved longitudinal health care records. In the short term standards will allow streamlined claims and payment that will reduce administrative costs. In addition to the standards themselves, HCFA is developing improved claims processing that will reduce the administrative costs for Medicare and Medicaid while allowing for improved interoperability with other insurers for coordination of benefits. These projects advance a number of the NII goals, but most notably promotion of seamless, interactive, user driven operation.

(4) Infrastructure Investments. There are numerous investments in support of infrastructure development particular to health applications. Some important projects to highlight include: NLM HPCC health care applications research and demonstrations support for test bed networks; NCRR Information Infrastructure Technology applications support; the National Institute of Standards and Technology's Advanced Technology Program's Information Infrastructure for Health care - a program designed to develop tools and prototype systems for health care that also accelerate infrastructure development; NASA's collaboration with the Health care Open Systems & Trials (HOST) consortium comprised of providers, insurers and IT companies working jointly to increase access to care through the use of advance information technology, initially focusing on computer-based patient records and an integrated community health care information network; grants from the National Telecommunications and Information Administration that are expected to support a number of health care demonstrations. All of these support expedited development of integrated health applications. This in turn supports the NII goals of promoting private sector investment, acting as a catalyst to technological innovation and new applications and promoting seamless interactive user driven operation.

Health Care

Agency Contributions

Health Care Access Programs

Community Facility Loans (USDA/RDA)

Community Services Work Station (DHHS/ACF, DHHS/PHS)

Telemedicine Demonstrations (USDA/REA, DHHS/HCFA, DHHS/NIH, DHHS/ORH, VA)

International Telemedicine Health Care Telecommunications Network (NASA)

Health Care Quality Programs

REA Distance Learning Medical Link Loan and Grant (USDA/REA)

1-800 telephone lines (DHHS/HCFA, DHHS/CDC, NHIC, & CANCER)

Internet/computer links (DoE; DHHS: CDC, CRDL, NHIC, HSTAR, HCFA, NLM, ODPHP, SAMSHA; DoL/OSHA; NASA)

Kiosk access to specific health applications (DHHS/SSA)

Wonder System (DHHS/CDC)

Health Care Cost Containment Programs

Medicare Transaction System (DHHS/HCFA)

Standards Initiatives (DHHS/HCFA, DHHS/AHCPR, VA)

Infrastructure Investments Specific to Health

ATP Information Infrastructure for Health Care (DoC/NIST)

NLM Medical Connections program (DHHS/NLM)

Global Health Monitoring Network (NASA)

Health Care Open Systems & Trials - HOST (NASA)

Manufacturing

I. Overview of Application

An advanced National Information Infrastructure (NII) will enable manufacturers to transform and significantly improve all stages of manufacturing operations, from technology/market assessment and R&D to after-sales support and product disposal or reuse. Manufacturers will be able to use the NII to quickly and efficiently transfer data within and among operations; to effectively and sensibly transact business and collaborate with customers and partners; to rapidly and "virtually" prototype, simulate, and test products and processes; and to make easily and readily available the best manufacturing tools, knowledge bases, product information, and training materials regardless of location.

However there are at present many barriers to achieving this vision. Much of the manufacturing of the future will be done at multiple sites that are networked together. At this time, there is not an effective network to make available the diverse manufacturing operations. In addition, the present manufacturing systems do not have interfaces that conform to national (or international) standards, making it expensive for sharing of manufacturing information which is necessary to the growth of "virtual enterprises." There is not a well developed framework of standard manufacturing processes that readily allows for the prototyping and testing of products from process models. There is a need for more structured information about manufacturing practices and processes. Finally, companies, especially small to medium size, will need to change their approach to manufacturing to adopt these new NII technologies, which also will require intense training for workers.

To overcome these barriers, the Administration, in cooperation with private industry, has initiated, expanded, and redirected programs designed to unleash the potential of the NII in a variety of civilian manufacturing areas. These efforts include research and development in support of advanced manufacturing technology and high performance computing and communications; programs to demonstrate, test, and deploy NII manufacturing applications into the private sector; and lastly, programs designed to improve manufacturing education and training.

While there are many government sponsored programs designed to facilitate the development, demonstration, and deployment of NII manufacturing applications, there are areas where the government should be investing more time and effort. For example, there is a need to accelerate the development and testing of industry-led standards for product data exchange, electronic commerce, and interoperability. There is also the need to provide more testbeds where NII applications can be prototyped and demonstrated in collaboration with industry as well as focused efforts in user-acceptability and information conversion. Lastly, and perhaps most importantly, the government needs to expand its technical assistance programs and to initiate serious efforts to address industry's needs in the areas of organizational learning and worker training.

II. Highlighted Initiatives

The Administration has crafted a government-wide strategy to speed the development and application of advanced manufacturing technologies. Federal involvement within the Manufacturing Arena can be divided into three categories: (1) Research and Development; (2) Deployment; and (3) Education and Training.

Manufacturing

II. Highlighted Initiatives (Continued)

(1) Research and Development. Programs falling under this category include infrastructure development that supports manufacturing applications. In addition to the base programs within the agencies there are two key thrust areas that are part of the research and development efforts within the National Science and Technology Council (NSTC): The High Performance Computing, Communications and Information Technology (HPCCIT) Subcommittee is promoting the application of information technology to the national challenge of manufacturing using the Information Infrastructure Technology and Applications (IITA) Initiative, and the Civilian Industrial Technologies (CIT) Committee is promoting a coordinated interagency effort to promote the development of advanced manufacturing technologies. Other important initiatives include:

- ***Systems Integration for Manufacturing Applications (SIMA) program (DoC/NIST).*** SIMA is an effort to develop, refine, test, and transfer advanced, computer-integrated, electronically-networked manufacturing technologies and associated applications. Research activities will focus on developing integration technologies, architectures, communication protocols and interface specifications for manufacturing software applications that support design, planning and production of products in the mechanical, apparel and process plant industries. A standards-based data exchange effort will target flexible computer integrated manufacturing issues to alleviate the lack of data exchange capability between manufacturing applications.
- ***Agile Manufacturing Initiative (NSF).*** This initiative includes a prototype of an information infrastructure to support distributed concurrent engineering, flexible manufacturing, and electronic commerce in manufacturing applications. The vision of agile manufacturing is to enable virtual companies to be formed by linking design and manufacturing operations that are physically distributed among a group of companies.
- ***Advanced Technology Program Computer-Integrated Manufacturing (CIM) for Electronics program (DoC/NIST).*** The Advanced Technology Program provides funding to support critical research needed to develop key commercial technologies, and to bring innovative products to market. CIM will increase substantially the base of suppliers of third-party electronics manufacturing software. The intention is that this supplier base would serve not only electronics manufacturers, but also other major manufacturing sectors such as automotive and aerospace. These goals will be achieved by encouraging electronics manufacturers to define and adopt an open CIM framework which will provide a market for others to design compliant software systems that require minimal manufacturers to rapidly respond to new market opportunities by being able to easily reconfigure their shop floor systems.

Manufacturing

II. Highlighted Initiatives (Continued)

(2) Deployment. Programs in this category include initiatives that bring useful technologies into the marketplace and further their adoption by the private sector.

- ***Technologies Enabling Agile Manufacturing (TEAM) program (DoE).*** TEAM will enhance industrial competitiveness by advancing and deploying manufacturing technologies that promote agility. TEAM is leveraging the expertise and resources of private industry and Federal Agencies to develop, integrate, and deploy leap-ahead technologies enhancing the responsiveness, flexibility, and cost-effectiveness of U.S. industry. The technologies and methodologies deployed by TEAM in the five thrust areas of Product Design and Enterprise Concurrency, Virtual Manufacturing, Manufacturing Planning and Control, Intelligent Closed-Loop Processing, and Integration will enable manufacturers to transition products from design to production faster, more efficiently, and at lower cost.
- ***Manufacturing Extension Partnership (MEP) Program's Electronic Communication Linkages (DoC/NIST).*** The MEP is an industrial extension service designed to transfer developed technologies to applications appropriate for smaller businesses. The MEP is designed to be a comprehensive, yet locally responsive, network of centers that help firms upgrade their equipment, improve their processes, and strengthen their business performance. The MEP is sponsoring a specific pilot program which will demonstrate the potential value of linking the extension centers using a major network system.

(3) Education and Training. Programs that not only educate the manufacturing community as to the benefits of NII-related technologies, but also provide training to users of the technologies.

- ***Technology Information Environment for Industry (DoE).*** TIE-IN is a new mechanism being developed by Sandia Labs for technology transfer that can realistically reach a large percentage of the small to mid-sized companies in the U.S. It has two primary goals: 1) to reach thousands of establishments, and 2) to reduce the industry investment required to use National Laboratory technologies. TIE-IN will utilize the NII and information technologies to build smart front-ends for many existing DOE technical capabilities and electronically guide users through the process of obtaining solutions. By using these smart front-ends both the required amount of direct staff interaction with the users, and the investment required by industry can be minimized. TIE-IN will operate as an electronic extension service accessible from Internet or modem to allow the user to quickly obtain solutions to problems from remote locations.

Manufacturing

Agency Contributions

Research and Development

Rapid Response Manufacturing (DoE)

*Systems Integrated Manufacturing Applications (DoC/NIST)

Information Integration for Simulation Based Design & Manufacturing (NSF)

*Agile Manufacturing Program (NSF)

*Advanced Technology Program Computer-Integrated Manufacturing for Electronics (DoC/NIST)

Deployment

Rural Business Enterprise Grants (USDA/RDA)

Manufacturing Extension Partnership Electronic Communication Linkages (DoC/NIST, DoE)

Advanced Manufacturing-NII (AM-NII) (DoE)

Object Oriented Design of Integrated Distribution Systems (DoE)

Technologies Enabling Agile Manufacturing (TEAM) (DoE)

Affordable Design and Manufacturing (ADAM) initiative (NASA)

Oak Ridge Centers for Manufacturing Technology -- Skills Campus and Virtual Enterprise Resource Center (TVA, DoE)

Education and Training

*Computational Testbed for Industry (CTI) (DoE)

Technology Information Environment for Industry (TIE-IN) program (DoE)

CALS Roadmap 2000 (DoE)

* Indicates initiative has been identified by the NSTC R&D Budget Cross-cut

Transportation

I. Overview of Application Area

Effective use of existing transportation systems and infrastructure is central to achieving high levels of performance and efficiency in meeting our transportation needs. Overlaying the existing transportation infrastructure with a complementary information infrastructure could dramatically improve transportation service, cost, safety and efficiency. Collective advances in information technology permit the development of an "intelligent" transportation system, in which system operators and users share information and cooperate to enhance system performance, efficiency, capability, and user satisfaction.

At the policy level, the implications of wide-scale application of information technology to transportation -- technology development, economic and physical access to technology solutions, safety impacts of applying various technologies have yet to be thoroughly assessed. Existing agency programs have evolved individually and lack a comprehensive understanding of transportation information needs across agencies or the crosscutting needs of national significance.

Compared to the use of information technology in air traffic control at the applications level, the nation's transportation sector has yet to maximize its use of modern sensing, communication, and information technologies. These technologies have much to offer activities such as routing transit buses, managing harbor traffic, optimizing urban highway use at rush hour, or dispatching maintenance crews. Replacing conventional approaches with methods employing modern technology will require transportation providers to totally re-conceptualize and re-engineer these functions.

Technology development to support the vision of an "intelligent" transportation system is needed to address deficiencies in several key areas. Tools for timely production of electronic maps and charts for navigation and route planning are inadequate; methods for keeping safety-critical electronic map and chart information current are limited. New weather systems are poised to provide vast sources of information that can be used to avert transportation accidents and adverse travel situations, yet the ability to analyze and disseminate such information in meaningful ways is lagging. There is a need to better understand the impact of weather on transportation operations (particularly in the surface modes) and the potential for weather information to influence transportation safety and efficiency. Transportation command/control functions and surveillance options for increasing uniform situation awareness among system and vehicle operators represent areas where further technology development and application would be helpful.

The NII initiatives for transportation provide the basis upon which current deficiencies can be addressed. These initiatives also establish a framework for assessing and developing information technology for transportation. Short-term objectives of the initiatives include agreeing upon a unified system architecture with uniform standards, procedures, and protocols for system development, implementation, operation and maintenance. This will facilitate both establishing a consensus on the roles and responsibilities of participants in the transportation system and reaching agreement on strategies to balance efficiency, mobility, safety, health and environmental impacts.

Transportation

II. Highlighted Initiatives

The Federal Government's efforts within the transportation application area have been divided into five categories: Intelligent Vehicle-Highway Systems; Spatial Data and Reference Infrastructure; Mesoscale Weather Systems; Air Traffic Management and Control; and Waterway Management and Vessel Traffic Systems.

(1) Intelligent Vehicle-Highway Systems (IVHS). A public/private partnership to develop and apply a variety of vehicle, roadway, electronics, communications, and information processing technologies and services critical to improve the efficiency and/or safety of our surface transportation systems.

(2) Spatial Data and Reference Infrastructure. Initiatives in this category will accelerate the development of spatial relationships throughout all transportation systems that are critical for tracking and locating.

(3) Mesoscale Weather Systems. Programs in this category will help to develop real time weather systems able to forecast the weather in a small region.

(4) Air Traffic Management and Control. These programs will develop enhanced precision, more flexible, higher quality Air Traffic Control management capabilities to reduce delay and operating costs to system users during excessive system demands.

(5) Waterway Management & Vessel Traffic Systems. These programs will develop waterway management and control techniques, communication and presentation of infrastructure, and senior technology critical to waterway management and vessel traffic.

Transportation

Agency Contributions

Intelligent Vehicle-Highway Systems IVHS (including APTS)

- *Wireless Microwave Communications and Sensors for IVHS (DoD)
- *Demonstrations and Other Activities (DoT/FHWA, DoT/FTA, DoT/NHTSA)
- *Research and Development (DoT/FHWA, DoT/FTA, DoT/NHTSA)

Spatial Data and Reference System

- Differential Global Positioning System (DoT/FAA, NASA)
- GPS Wide Area Augmentation System (DoT/FAA)
- *Electronic Maps and Charts (DoT/FAA, DoC/NOAA)
- *Satellite Navigation R&D (DoT/FAA)

Mesoscale Weather Systems

- ASR Weather Systems Processor (DoT/FAA)
- Aviation Weather Products Generator (DoT/FAA)
- Integrated Terminal Weather System (DoT/FAA)
- *Aviation Weather Detection / Dissemination (DoT/FAA)
- *Weather System Planning and Impact Assessment (DoT/FAA)

Air Traffic Management and Control

- *Sensors for Air Transportation System Capacity and Safety (DoD)
- Terminal Area Productivity (TAP) (DoT/FAA, NASA)
- ATC System Infrastructure (DoT/FAA, NASA)
- *Airport Surface Traffic Automation (DoT/FAA)
- *Air Traffic Management Technology (DoT/FAA)
- *Oceanic ATC Automation (DoT/FAA)
- *Terminal Area Surveillance System (DoT/FAA)
- *Terminal ATC Automation (DoT/FAA)

Waterway Management & Vessel Traffic Systems

- Infrastructure Deployment (DoT/USCG, DoT/MARAD, DoC/NOAA)
- *Research and Development (DoT/USCG, DoT/MARAD, DoC/NOAA, DoD/ACE)

* Indicates initiative has been identified by the NSTC R&D Budget Cross-cut