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**Folder Title:**  
Information Infrastructure Task Force (also known as NIITF) [2]

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### COLLECTION:

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

### FOLDER TITLE:

Information Infrastructure Task Force (also known as NIITF) [2]

2019-0203-F

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### 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]

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#### 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]

*Action: Jon Bala*THE SECRETARY OF COMMERCE  
Washington, D.C. 20230

SEP 28 1994

*Joe in power*

MEMORANDUM FOR: HEADS OF EXECUTIVE DEPARTMENTS AND AGENCIES  
FROM: RONALD H. BROWN   
SUBJECT: INFORMATION INFRASTRUCTURE TASK FORCE MEETING

You are invited to attend the fifth Information Infrastructure Task Force (IITF) meeting on Tuesday, October 4, 1994, from 1 to 3 p.m., in Room 4830 at the Department of Commerce. We have some critical matters to address next Tuesday, including discussion of the Task Force's draft "FY 1996 NII Applications Highlights Report," which recommends support for key on-going and planned programs and projects in various agencies that accelerate the development and deployment of the National Information Infrastructure (NII). The purpose of this report, which upon IITF review will be submitted to OMB as part of the FY 1996 budget process and will form the basis for a public NII budget supplement, is to increase support for NII-related activities in the core programs of your agency.

We also will be seeking policy guidance on what the Administration's NII agenda should focus on next year. With the recent release of the IITF's "NII Progress Report" highlighting our 1993-1994 accomplishments and progress, now is a good time to take stock of what we have done and the challenges that lie ahead. Please come Tuesday prepared to offer your agency's perspective on what the Administration's NII-related priorities should be in the coming year. The development of our "Global Information Infrastructure: Agenda for Cooperation" and approval of a draft report entitled "Services and the NII," which recommends activities to advance development of an NII services infrastructure, also are on the meeting agenda. Background information and a complete agenda will be distributed to you shortly, along with the NII Progress Report and drafts of the "FY 1996 NII Applications Highlights Report" and "Services and the NII" for your review. I hope you will join us for what I am sure will be a productive and informative meeting.

Due to limited seating availability, we request that no more than two representatives of your Department or Agency attend the meeting. To reserve a seat, please fax your name, agency, and office number to Yvette Barrett of the National Telecommunications and Information Administration (NTIA) at 202/482-0979 (fax) by close of business on Friday, September 30, 1994. If you have any questions, Ms. Barrett can also be reached at 202/482-1835 (office) or ybarrett@ntia.doc.gov (e-mail).

Thank you for your participation. I look forward to seeing you on October 4.



**NTIA/OPCM**  
**FAX**



**UNITED STATES DEPARTMENT OF COMMERCE**  
National Telecommunications and  
Information Administration  
Room 4888, HCH Building  
Washington, D.C. 20230

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|-------------------------------------------------------------------------------|------------------------------|------------------------------|
| <b>TO:</b> See Distribution List                                              |                              | <b>FAX:</b>                  |
|                                                                               |                              | <b>PHONE:</b>                |
| <b>FROM:</b> IITF Secretariat<br>Office of Policy Coordination and Management |                              | <b>FAX:</b> (202) 482-0979   |
|                                                                               |                              | <b>PHONE:</b> (202) 482-1835 |
| <b>DATE:</b> September 29, 1994                                               | <b>PAGES:</b> This + Pages 1 |                              |

**MESSAGE**

**Information Infrastructure Task Force  
(Executive & Agency Heads)**

|                                           | <b>Office</b> | <b>Fax</b>   |
|-------------------------------------------|---------------|--------------|
| Honorable Bruce Babbitt (Interior)        | 202-208-7351  | 202-208-6956 |
| Honorable D. James Baker (NOAA/DOC)       | 202-482-3436  | 202-408-9674 |
| Honorable David Barram (Commerce)         | 202-482-4825  | 202-482-3610 |
| Honorable Lloyd Bentson (Treasury)        | 202-622-0190  | 202-622-0073 |
| Honorable James H. Billington (LC)        | 202-707-5205  | 202-707-1714 |
| Honorable Anne K. Bingaman (DOJ)          | 202-514-2401  | 202-616-2645 |
| Honorable Erskine Bowles (SBA)            | 202-205-6606  | 202-205-6802 |
| Honorable Walter Broadnax (HHS)           | 202-690-7431  | 202-690-7755 |
| Honorable Jesse Brown (Veterans Affairs)  | 202-273-4800  | 202-273-4877 |
| Honorable Ronald H. Brown (Commerce)      | 202-482-2112  | 202-482-4676 |
| Honorable Carol M. Browner (EPA)          | 202-260-4700  | 202-260-0279 |
| Honorable Warren M. Christopher (State)   | 202-647-5291  | 202-647-6434 |
| Honorable Henry G. Cisneros (HUD)         | 202-708-0417  | 202-708-2476 |
| Honorable Mike Espy (Agriculture)         | 202-720-3631  | 202-720-5437 |
| Honorable Daniel S. Goldin (NASA)         | 202-358-1010  | 202-358-2810 |
| Honorable Albert Gore, Jr.                | 202-456-2326  | 202-456-7044 |
| Honorable Michael Huerta (DOT)            | 202-366-5781  | 202-366-7952 |
| Honorable Reed E. Hundt (FCC)             | 202-418-1000  | 202-632-0163 |
| Honorable Larry Irving (NTIA/DOC)         | 202-482-1840  | 202-482-1635 |
| Honorable Roger W. Johnson (GSA)          | 202-501-0800  | 202-219-1243 |
| Honorable Sally Katzen (OIRA/OMB)         | 202-395-4852  | 202-395-3047 |
| Dr. Neal Lane (NSF)                       | 703-306-1000  | 703-306-0109 |
| Honorable George Munoz (Treasury)         | 202-622-0410  | 202-622-2337 |
| Honorable Hazel Rollins O'Leary (Energy)  | 202-588-6210  | 202-586-7644 |
| Honorable Emmet Palge Jr. (ASCCI/Defense) | 703-695-0348  | 703-614-8060 |
| Honorable Leon Panetta (White House)      | 202-456-6797  | 202-456-2464 |
| Honorable Federico F. Pena (DOT)          | 202-366-1111  | 202-366-7202 |
| Honorable William Perry (Defense)         | 703-695-5261  | 703-697-9080 |
| Honorable Arati Prabhakar (NIST/DOC)      | 301-975-2300  | 301-868-8972 |
| Honorable Robert B. Reich (Labor)         | 202-219-8271  | 202-219-8822 |
| Honorable Janet Reno (Justice)            | 202-514-2001  | 202-514-4371 |
| Honorable Richard W. Riley (Education)    | 202-401-3000  | 202-401-0596 |
| Honorable Donna E. Shalala (HHS)          | 202-690-7000  | 202-690-7595 |
| Honorable Joe Stiglitz (CEA)              | 202-395-5036  | 202-395-6947 |
| Honorable Laura D. Tyson (CEA)            | 202-395-6042  | 202-395-6958 |
| Honorable R. James Woolsey (CIA)          | 703-482-1100  | 703-482-4445 |



**NIST****UNITED STATES DEPARTMENT OF COMMERCE  
National Institute of Standards and Technology**

Gaithersburg, Maryland 20899

OFFICE OF THE DIRECTOR

*C. J. B.***SEP 29 1994**

## MEMORANDUM FOR IITF Members

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

Subject: Transmittal of Rough Draft of FY 1996 NII Applications Highlights

For the past several months, the Committee on Applications and Technology (CAT) has led an interagency effort to develop a document that highlights the on-going and planned FY 1996 programs throughout the Federal government necessary to support the Administration's NII goals and objectives. This document, which will be submitted to OMB next month, is designed to increase support for NII-related activities in the core programs of your agency. To date, we have received a great deal of input and assistance from the many Information Infrastructure Task Force (IITF) member agencies and would like to express our appreciation for your agency's attention and involvement.

Based on the submissions we have received so far, however, we are still missing many important NII programs and projects. In addition, we have determined that at this time it is not feasible to attempt to include budget figures with the initial report to be transmitted to OMB on October 24. Instead, we would like to concentrate our efforts on creating an initial submission to OMB which provides a picture of NII programs and projects, both on-going and proposed, across the government in support of the accelerated use of the NII. The purpose of this document will be to increase the visibility and promote the funding of essential NII programs and projects during the FY 1996 budget process. Again, this initial report will not contain budget figures.

As the budget season progresses and more information and budget figures become available, the CAT will update the initial report and prepare a second report which will accompany the formal release of the President's FY 1996 Budget in February. This second document will provide the public and Congress with a clear and compelling description, with budget figures, of the Administration's key efforts to accelerate NII applications.

Attached is a rough draft of the initial NII Applications Highlights report that the IITF plans to transmit to OMB on October 24. This draft provides the framework for the initial submission to OMB and is based on all the responses we have received to date. Please note that the kind and quality of agency input so far has varied widely and that this fact is reflected in the rough draft. Also note that two problems which necessitate your attention still exist:

- many good, NII-related programs were not reported and thus are not included;
- some agency input lacked sufficient detail for the CAT to recognize the value of the programs.

**Please review the specific application areas that concern your department or agency and be prepared to discuss your findings at the October IITF principals meeting.**

We have an opportunity to make a significant contribution to the Administration's NII effort by focusing attention on NII applications in the FY 1996 budget process, but we will need a substantial effort from the IITF members to make it work. I would like to thank you for your continued time and attention, and I look forward to seeing you at the October 4 IITF meeting.

Attachment

bc: Y. Barrett  
100  
J. Burrows  
C. Furlani  
Chron

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**DRAFT**

**Rough Draft**  
**NII Applications Highlights**  
9/29/94

## **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).

As part of that effort, the IITF has prepared this report to identify and illustrate what the Administration is and should be doing to foster 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 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 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. Additionally, we hope that agencies will use this information to identify opportunities for cooperation to maximize the Federal investment in NII-related activities. Agencies interested in similar types of applications can take advantage of opportunities for partnership by working jointly on a project. This document provides a framework for both meaningful input to the FY 1996 budget process and a future public document to inform the public of the scope and range of the Administration's NII investments and efforts.

## **Introduction**

This FY 1996 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.

The NII will consist of (1) interconnected, interoperable telecommunications networks, (2) computer systems, televisions, fax machines, telephones, and other "information appliances," (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, for 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. 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. 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) 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. 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, government services, health care, manufacturing, and transportation.

From the end of July through September, a team of CAT participants from several Federal Agencies reviewed the first round of agency submissions and developed a framework for highlighting the Administration's NII-related efforts. To date, we have received responses from 18 agencies and information on over 320 initiatives and programs.

The culmination of this effort is represented in this report which was reviewed by the IITF at its meeting on October 4, 1994. For each of the eight applications areas, we have created a comprehensive spreadsheet that organizes agency initiatives into categories that reflect important issues or objectives for that application. A summary description of existing Federal efforts is presented along with specific information to highlight key initiatives.



# Highlighted NII Initiatives

***Application Areas*** (List of Participating Agencies is based on information received as of 9/28/94)

## **Digital Libraries**

Comprehensive Digital Library Initiatives (NASA, NSF)  
New Technologies and Information Products (DoE, NASA)  
Seamless Electronic Information Location & Access (DoC/Census, DoD/DISA, DoE, NASA, SBA)  
Library Infrastructure Grants (Ed, USDA)

## **Education**

Federal Leadership Activities (DoC/NOAA, EPA)  
Planning (Ed)  
Research and Development (DoC/NOAA, Ed, NEH, NSF)  
Deployment of Technology (USDA/RDA, USDA/REA, DoC/NTIA, DoE, Ed, NEH)  
Professional Development (DoC/NTIA, Ed, NASA, NEH)

## **Electronic Commerce**

Development of Technology (DoE, Treasury)  
Development of Standards (DoD/DISA, NASA)  
Development of Architectures (DoC/NIST, DoD/DISA, DoE, GSA, Treasury)  
Development of Applications/Demonstrations (USDA, DoC/NIST, DoD/DISA, DoE, HHS, NASA, SBA, DoL)

## **Environmental Monitoring**

Research and Modelling Programs (USDA/Forest Service, DoC/NOAA, DoE, EPA, NASA)  
Information Dissemination (DoC/NOAA, DoE, DoI/NBS, EPA)  
Data Standards (USDA, DoI, EPA)  
HPCC Projects (DoC/NOAA, DoE, NASA, NSF)

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# Highlighted NII Initiatives (cont'd)

*Application Areas (List of Participating Agencies is based on information received as of 9/28/94)*

## **Government Services**

Information Access Projects (USDA/NAL, USDA/SCS, DoC/NTIA, DoI, DoJ/FBI, DoL, Ed, GSA, NASA, NEH)  
 National Performance Review Projects (USDA, DoC/NOAA, DoJ, GSA, HHS, Treasury, Treasury/IRS, Treasury/Customs)  
 HPCCI & IITA (DoC, DoD, DoE, EPA, HHS/NIH, NASA, NSF,)  
 Service Delivery Projects (USDA, DoC/NOAA, DoI/BLM, DoL/OSHA, HHS/SSA, NARA, Treasury/IRS, VA/VBA)  
 Infrastructure Projects (USDA, HHS/SSA, DoI/MMS, DoI/NPS, DoL, NARA, SBA)

## **Health Care**

Health Care Access Programs (USDA/RDA, HHS/HCFA, HHS/ORH, HHS/NIH, NASA)  
 Health Care Quality Programs (USDA/REA, HHS/DCF, HHS/HCFA, HHS/NHIC, HHS/HSTAR, HHS/SAMSHA)  
 Health Care Cost Containment Programs (HHS/ACHPR, HHS/HCFA)  
 Infrastructure Investments Specific to Health (DoC/NIST, HHS/NLM, NASA)

## **Manufacturing**

Research and Development (DoC/NIST, DoE, EPA, NSF)  
 Deployment (DoC/NIST, DoE, NASA)  
 Education and Training (DoC/NIST, DoE)

## **Transportation**

Intelligent Vehicle-Highway Systems IVHS, including APTS (DoT/FHWA, DoT/FTA, DoT/NHTSA)  
 Spatial Data and Reference Infrastructure (DoT/FAA)  
 Mesoscale Weather Systems (DoT/FAA)  
 Digital Mobile Communications (DoT/FAA)  
 Air Traffic Management and Control (DoT/FAA)  
 Waterway Management & Vessel Systems (DoC/NOAA, DoT/ACE, DoT/MARAD, DoT/USCG)  
 DoD Programs identified by NSTC Budget Cross-cut

**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 libraries could 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, but there are barriers to the realization of this vision.

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 are taking place in almost every Federal Agency that will help breakdown the technological barriers to achieving the digital library vision. Some agencies such as the National Aeronautics and Space Administration (NASA) and the National Science Foundation have established comprehensive digital library programs that are structured to meet the goals of the NII. These efforts involve private sector as well as government investment.

Other Federal Agencies have targeted the development of specific technologies relevant to digital libraries. For example, the National Institute of Standards and Technology is developing a spoken natural language interface to libraries. 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 important. 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 will be critical to realizing the digital library vision.

## Digital Libraries

### Agency Contributions as of 9/28/94

#### Comprehensive Digital Library Initiatives

Digital Library Project (NASA)

\*Digital Library Project (NSF)

#### New Technologies

Computer Incident Advisory Capability (DoE)

Digital SuperLab (DoE)

Intelligent Archive (DoE)

National Storage Lab (DoE)

NASA Access Mechanism (NASA)

#### Seamless Electronic Information Location and Access

##### *Scientific and Technical Information*

DoE Information Locator Prototype (DoE)

Digital Library for Energy and the Environment (DoE)

NASA STI Program Infrastructure Upgrade (NASA)

National Technology Transfer Center (NASA)

##### *Environmental Data*

Earth Observing System (EOS) Pathfinder (NASA)

##### *Software*

DISA Repository Systems (DoD/DISA)

NetLIB (DoE)

Repository-based Software Engineering Program (NASA)

SBA Software Repository (SBA)

##### *Business/Economic*

STAT-USA Data Dissemination (DoC/Census)

##### *Humanities*

Collaborative Projects Program (NEH)

Division of Preservation and Access (NEH)

Editions 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 Budget Cross-cut



## Digital Libraries

### II. Highlighted Initiatives

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.

**(1) Comprehensive Digital Library Initiatives.** Both NASA and NSF have established comprehensive, multi-year digital library initiatives during FY94 which are specifically targeted at achieving the NII goals for government action. These initiatives encourage private sector participation in programs to promote technological innovation and new applications with regard to digital libraries on the NII. The NASA effort encourages the use of remote sensing data over the Internet and the projects involve broadcast TV, cable TV, industry, academia, K-12 schools, and museums. Areas of investigation include universal service, education, user interfaces, and security.

**(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 a wide range of information from the government and other sources. Initiatives in this area are addressing scientific and technical information, environmental data, 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 and the Department of Agriculture's Community Facility Loans provide this assistance of this type.

## 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.



## Education

|                                                                                                               |
|---------------------------------------------------------------------------------------------------------------|
| <b>Agency Contributions as of 9/28/94</b>                                                                     |
| <b>Federal Leadership Activities</b>                                                                          |
| Global Learning and Observation to Benefit the Environment (DoC/NOAA, EPA)                                    |
| <b>Planning</b>                                                                                               |
| *Goals 2000: Educate America Act (Ed)                                                                         |
| Regional Education Laboratories (Ed)                                                                          |
| <b>Research and Development, Including Demonstrations</b>                                                     |
| Support Science for Education using Environmental Information through NII (DoC/NOAA)                          |
| 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 -- Teacher Networking Grants (Ed)                                            |
| *National Institute on Disability and Rehabilitation Research (Ed)                                            |
| Special Education -- Technology Applications (Ed)                                                             |
| Technology, Educational Media, and Materials Program (Ed)                                                     |
| Leadership Opportunity in Science and Humanities Education (NEH)                                              |
| Special Opportunity in Foreign Language Education Grants (NEH)                                                |
| *Networking Infrastructure for Education Program (NSF)                                                        |
| <b>Deployment of Technology</b>                                                                               |
| Distance and Community Learning from the Cooperative Extension Service (USDA)                                 |
| Community Facility Loans- Rural Development Administration (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)                                                                                                  |
| Oak Ridge Centers for Manufacturing Technology (OCRMT) Skills (DoE)                                           |
| OSHA Employee and Employer Education and Training (DoL/OSHA)                                                  |
| Division of State Programs (NEH)                                                                              |

Education continues on next page.

**Education (cont'd)****Agency Contributions as of 9/28/94****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)

NEH Teaching with Technology Initiative (NEH)

\* Indicates initiative has been identified by the NSTC Budget Cross-cut



## Education

### 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. 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 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).*** This program 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.
- ***Information Infrastructure Grant Program (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 will provide support to states, school districts, and schools in the use of technology, including networks, and will provide professional development opportunities for educators.



## 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

### Agency Contributions as of 9/28/94

#### Development of Technology

Digital Signature Standard Smart Card (DoE)  
 Xunet (DoE)  
 Security Systems for networked environment (DoE, Treasury)

#### Development of Standards

Defense Message System (DoD/DISA)  
 Digital Signature and Security Services System (NASA)

#### Development of Architectures

Technical Architecture for Information Management (DoD/DISA)  
 CALS (DoE)  
 Electronic Billing and Payment for the Manufacturing Industry (DoE, Treasury, DoC/NIST)  
 Electronic Acquisitions (GSA)  
 Electronic Commerce Architecture for Acquisition (GSA)  
 Security Infrastructure Pilot (GSA)

#### Development of Applications/Demonstrations

Electronic Commerce & Electronic Data Interchange Pilots (USDA, DoE, DoL, DoD/DISA, HHS)  
 AMTEX - Demand Activated Manufacturing Architecture (DoE)  
 Multimedia data exchange project (DoE)  
 Open Systems Laboratory (DoE)  
 Technology 2020 (DoE)  
 Postal Electronic Commerce Services (NASA)  
 Data Encryption Technology (SBA)



## 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. Highlighted programs include:

- ***Continuous Acquisition and Life-Cycle Support (CALS) Program (DoE).*** CALS is a Department of Defense and and Department of Energy program to improve information storage and flow between participating agencies and their contractors.
- ***Federal Electronic Commerce Acquisition Team (Government-wide).*** The Federal Electronic Commerce Acquisition Team (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."

**(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.

## Environmental Monitoring

### 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 and protection 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

### Agency Contributions as of 9/28/94

#### Research and Modelling Programs

|                                                                                            |
|--------------------------------------------------------------------------------------------|
| Infrastructure Project (USDA/Forest Service)                                               |
| Information on Decadal to Centennial Climate (DoC/NOAA)                                    |
| Searchable Archive of NOAA Data for Seasonal to Interannual Forecasting (DoC/NOAA)         |
| Defense Programs -- Distributed Generation and Use of a Synthetic 3D Seismic Dataset (DoE) |
| Defense Programs -- Lynx (DoE)                                                             |
| Defense Programs -- NII Accessibility for Independent Gas and Oil Producers (DoE)          |
| Environmental Monitoring Assessment Program (EPA)                                          |
| Environmental Technology Initiative (EPA)                                                  |
| Global Climate Change (EPA)                                                                |
| Multimedia Research Program (EPA)                                                          |
| Global Meteorological Satellites (GMS) Online (NASA)                                       |

#### Information Dissemination

|                                                                                                    |
|----------------------------------------------------------------------------------------------------|
| Base Network Connectivity (DoC/NOAA)                                                               |
| Interagency National Environmental Index (DoC/NOAA)                                                |
| Management and Dissemination of Weather Data in Near-real-time (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)                                                           |
| Emergency Preparedness Efforts (EPA)                                                               |
| Global Learning and Observation to Benefit the Environment -- GLOBE (EPA, DoC/NOAA)                |
| National Biological Survey (NBS) / National Biological Information Infrastructure - NBII (DoI/NBS) |

#### Data Standards

|                                                                                     |
|-------------------------------------------------------------------------------------|
| 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 efforts (EPA)                                                      |
| US Geological Survey / National Spatial Data Infrastructure - NSDI (DoI/USGS)       |

#### High Performance Computing and Communications

|                                                                                       |
|---------------------------------------------------------------------------------------|
| *Advanced Computation (DoC/NOAA)                                                      |
| *GFDL High Performance Computing System for climate and weather research (DoC/NOAA)   |
| *HPCC System for NMC (DoC/NOAA)                                                       |
| *Information Dissemination Activities (DoC/NOAA)                                      |
| *Support Science for Education using Environmental Information Through NII (DoC/NOAA) |

\* Indicates initiative has been identified by the NSTC Budget Cross-cut



## Environmental Monitoring

### II. Highlighted Initiatives

The programs highlighted for environmental monitoring promote four main goals: research and modeling, information access/connectivity, data standards for interoperability and processing very large data volumes via High Performance Computing and Communications (HPCC) initiatives.

**(1) 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 types of geographic information system (GIS) data from mapping and charting to 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 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) Data Standards** 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 exchange and metadata standards needed to implement the NSDI. As a decentralized system, the primary focus of the GCDIS is to establish and maintain effective mechanisms to integrate the disparate elements of information and data. Current plans call for the adoption of common standards for data exchange.

**(4) High Performance Computing and Communications (HPPC)** In 1993, a major new element, referred to as Information Infrastructure Technology and Applications (IITA) was incorporated into the HPPC agenda to advance the use of HPCC technologies in the development of the NII. Environmental Monitoring is one of approximately eight applications that define and establish technical requirements for implementing advanced telecommunications systems and services under IITA. Technologies developed under HPPC will provide the transport mechanism and data translation services to allow the user to work with many heterogeneous databases that are geographically dispersed.



## 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 the 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 outlines a three part agenda for spreading information technology's benefits to the Federal Government: (1) strengthening leadership in information technology, (2) implementing electronic government, and (3) establishing support mechanisms for electronic government. The NII initiatives highlighted below will help accelerate the Administration's move towards "electronic government."

## Government Services

### Agency Contributions as of 9/28/94

#### Information Access Projects

|                                                                                                   |
|---------------------------------------------------------------------------------------------------|
| Electronic Information Delivery at the National Agriculture Library (USDA/NAL)                    |
| NSDI Environmental Data - digitization and increased access (USDA/SCS, interagency)               |
| Networking Pilot and Demonstration Grants (DoC/NTIA)                                              |
| Libraries, Dissemination, and Distance Learning (Ed)                                              |
| Clearinghouse on Computer Accommodation - IT Accommodation and Accessibility (GSA)                |
| Agency Implementations of the Recommendations of the Electronic Mail Task Force (Government-wide) |
| Electronic Research Administration Program for the Management of Grants (HHS/NIH)                 |
| SSA National 800 number (HHS/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)     |
| Freedom of Information and Privacy Act Document Processing System Project (DoJ/FBI)               |
| Bulletin Board System (DoL)                                                                       |
| Employment and Training Administration - Training Technology Resource Center (DoL)                |
| OSHA - Access to Integrated Management Information System Information (DoL/OSHA)                  |
| National Technology Transfer Center (NTTC) Gateway and Resource Center (NASA)                     |
| Division of Public Programs: A National Conversation on American Pluralism and Identity (NEH)     |
| Business Information Centers (SBA)                                                                |
| SBA Online (SBA)                                                                                  |

#### National Performance Review Projects

|                                                                                                              |
|--------------------------------------------------------------------------------------------------------------|
| Electronic Benefit Transfer (USDA, HHS, Treasury)                                                            |
| National Environmental Data Index (DoC/NOAA)                                                                 |
| Coordinate, Recommend, and Implement IT Initiatives to Improve Customer Service (GSA)                        |
| Develop Government's Information Infrastructure - Telecommunications & Post-FTS2000 Environment (GSA)        |
| Develop Systems and Mechanisms to Ensure Privacy and Security (GSA)                                          |
| Establishment of an Electronic Mail Program Office (GSA)                                                     |
| Implement an Integrated, Government-wide, National One-stop 800 Number Calling Service (GSA)                 |
| Implement an Integrated, One-stop Government Services Kiosk (GSA)                                            |
| Implement an Integrated, One-stop On-line Service (GSA)                                                      |
| Plan for the Effective Use of IT Throughout Government - Support of GITS, E-mail, etc. (GSA)                 |
| Provide Training and Technical Assistance in IT to Federal Employees (GSA)                                   |
| Work with Private Industry to Advance the Implementation of IT to Provide Citizen Access to Government (GSA) |
| Consolidate and Integrate Federal Government Private Networks (GSA, Treasury)                                |
| Reengineer Basic Systems for Improved Delivery of Government Services (GSA, Treasury)                        |
| Consolidate and Modernize Government Data Processing Centers (HHS, Treasury)                                 |
| Intergovernmental Tax Filing (Treasury/IRS)                                                                  |
| International Trade Data Index (Treasury/Customs)                                                            |
| National Law Enforcement / Public Safety Network (Treasury, DoJ/FBI)                                         |
| Government Electronic Mail Directory (HHS)                                                                   |

Government Services continues on next page.



**Government Services (cont'd)****Agency Contributions as of 9/28/94****HPCCI & IITA**

\*High Performance Computing and Communications Initiative (DoC, HHS/NIH, NASA, NSF, DoE, DoD, EPA)

\*Information Infrastructure and Technology Applications (DoC, HHS/NIH, NASA, NSF)

**Service Delivery Projects**

InfoShare (USDA)

Weather Service Modernization (DoC/NOAA)

Reengineering Disability System (HHS/SSA)

Social Security Automation Investments (HHS/SSA)

Submission Management and Review Tracking (SMART) Program (HHS/FDA)

Automated Land and Mineral Record System - ALMERS (DoI/BLM)

Implementation of "CSHO 2000" Project and Development of Electronic Reference Materials (DoL/OSHA)

Archival Information Infrastructure (NARA)

Tax Systems Modernization (Treasury-IRS)

VBA Modernization (VA/VBA)

**Infrastructure Projects**

Telecommunications and Information Infrastructure (USDA)

Automation Investment Fund (HHS/SSA)

Integrated Disbursement and Information System (HUD)

Minerals Management Service (MMS) / Wide Area Network (DoI/MMS)

National Park Service (NPS) / ParkNet II (DoI/NPS)

Office of the American Workplace BBS (DoL)

E-mail Networks (DoL/OSHA, HHS, SBA)

Integrated Management Information System (DoL/OSHA)

Wide Area Network (NARA)

Agency-wide electronic mail and connection to Internet (SBA)

\* Indicates initiative has been identified by the NSTC Budget Cross-cut

## Government Services

### 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) Information Infrastructure Grant Program, 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.

**(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.

**(3) Proposed High Performance Computing and Communications (HPCC) Initiative.** HPCC investments provide research support to create more powerful computers, faster computer networks, and more sophisticated software. This research helps to address computing problems known as "Grand Challenges" such as forecasting weather, designing life-saving drugs, and modeling aircraft design. HPCC investments also support the development and testing of Information Infrastructure Technology and Applications for such activities as education, libraries, manufacturing, and health care.

**(4) 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.

**(5) Proposed Investments in Agency Infrastructure** Investments in agencies' existing information infrastructure will use information technology to make agency connectivity a reality. This includes strengthening the telecommunications backbone to assist in inter-agency electronic mail, adding employee bulletin board systems, as well as local and wide area networks.



## 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 also has 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 concern 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

### Agency Contributions as of 9/28/94

#### Health Care Access Programs

Community Facility Loans (USDA/RDA)

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

Telemedicine Demonstrations (HHS/ORH, HHS/HCFA, HHS/NIH)

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 (HHS/HCFA, NHIC & CANCER)

Internet / computer links (HHS: NHIC, PDQ, HSTAR, HCFA, SAMSHA)

Kiosk access to specific health applications (HHS/SSA)

Wonder System (HHS/CDC)

#### Health Care Cost Containment Programs

Medicare Transaction System (HHS/HCFA)

Standards Initiatives (HHS/HCFA, HHS/AHCPR)

#### Infrastructure Investments Specific to Health

ATP Information Infrastructure for Health Care (DoC/NIST)

NLM Medical Connections program (HHS/NLM)

Global Health Monitoring Network (NASA)

Health Care Open Systems & Trials - HOST (NASA)



## 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 Institute 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; 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. 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.



## 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 the labor base.

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.

## Manufacturing

### Agency Contributions as of 9/28/94

#### Research and Development

Rapid Response Manufacturing (DoC/NIST & DoE)

\*Systems Integrated Manufacturing Applications (DoC/NIST)

Design for the Environment (EPA)

\*Agile Manufacturing Program (NSF)

#### Deployment

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

Object Oriented Design of Integrated Distribution Systems (DoE)

ORCMT Virtual Enterprise Resource Center (DoE)

Technologies Enabling Agile Manufacturing (DoE)

Affordable Design and Manufacturing (ADAM) initiative (NASA)

#### Education and Training

Manufacturing Extension Partnership (DoC/NIST)

\*Computational Testbed for Industry (DoE)

Continuous Acquisition and Life-Cycle Support (CALS) program (DoE)

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

\* Indicates initiative has been identified by the NSTC Budget Cross-cut



## Manufacturing

### II. Highlighted Applications

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.

**(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.

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

- ***ATP Computer-Integrated Manufacturing (CIM) for Electronics program (DoC/NIST).*** 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 Applications (Continued)

- ***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.

**(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.

- ***Continuous Acquisition and Life-Cycle Support (CALS) initiative (DoE).*** CALS will enable more effective generation, exchange, management, and use of digital data supporting the life cycle of a product through the use of international standards, business process change, and advanced technology application. A key part of this program is the effort by the CALS/CE Industry Steering Group that works closely with the CALS program to facilitate the development, implementation, and deployment of the technologies defined by the CALS information standards.
- ***Manufacturing Extension Partnership (MEP) program (DoC/NIST).*** The MEP is an industrial extension service designed to transfer developed technologies to applications appropriate for smaller businesses. The MEP is sponsoring a specific pilot program which will demonstrate the potential value of linking the extension centers using a major network system.
- ***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.



## 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, there has been no comprehensive assessment to date of 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. None of the existing agency programs presents a conceptual understanding of transportation information needs across agencies, nor have they identified crosscutting needs of national significance.

At the applications level, the transportation sector currently is not maximizing 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 significantly. 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 options for increasing uniform situation awareness among system and vehicle operators represent areas where technology development is especially lacking.

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. Among the 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

### Agency Contributions as of 9/28/94

#### Intelligent Vehicle-Highway Systems IVHS (including APTS)

- \*Demonstrations and Other Activities (DoT/FHWA, DoT/FTA, DoT/NHTSA)
- \*Research and Development (DoT/FHWA, DoT/FTA, DoT/NHTSA)

#### Spatial Data and Reference System

- GPS Wide Area Augmentation System (DoT/FAA)
- \*Electronic Map and Chart Production Automation (DoT/FAA)
- \*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)

#### Digital Mobile Communications

- \*Aeronautical Communications Data Link R&D (DoT/FAA)
- \*NII Planning and Integration Testbeds (DoT/FAA)

#### Air Traffic Management and Control

- ATC System Infrastructure (DoT/FAA)
- \*Airport Surface Traffic Automation (DoT/FAA)
- \*Air Traffic Management (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)

#### DoD Programs

- \*Sensors for Air Transportation System Capacity and Safety
- \*Wire-com Engine for Communication
- \*Wireless Microwave Communications and Sensors for IVHS

\* Indicates initiative has been identified by the NSTC Budget Cross-cut



## Transportation

### II. Highlighted Initiatives

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

**(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 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) Digital Mobile Communications.** Programs in this category will address digital technologies in mobile communications which will be an important part of new, integrated transportation systems.

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

**(6) 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.

**(7) DoD Programs** DoD has a large investment in transportation information infrastructure, much of which is invested in command and control.

**NIST**

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

SEP 23 1994

Action: Eric Wolff  
cc: TSS

MEMORANDUM FOR Information Infrastructure Task Force

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

Subject: New CAT Reports

Attached for your review and comment is "Services and the National Information Infrastructure," a report of the Technology Policy Working Group (TPWG). This document examines the issues associated with the services infrastructure in the NII and makes recommendations concerning the steps that government should take to advance the development of a coherent services strategy.

*in Power*  
Please review this document and be prepared to discuss it at our October 4, 1994, IITF meeting. If you have any questions or suggestions on the TPWG document, please contact Howard Frank at ARPA (telephone: 703-696-2409, fax: 703-696-2208, or e-mail: hfrank@arpa.mil).

I have also included a copy of the Government Information Technology Services Working Group document, "A Vision for Government Information Technology Services and the NII" for your information.

I appreciate your assistance in the review of the TPWG document and look forward to seeing you on October 4.

Attachments

2 w/ Eric Wolff



**DRAFT  
NOT FOR PUBLIC RELEASE**

## **Services and the National Information Infrastructure**

**Technology Policy Working Group  
Committee on Applications and Technology  
Information Infrastructure Task Force**

**September 20, 1994**

## Services and the National Information Infrastructure

### *Report of the Technology Policy Working Group, of the Information Infrastructure Task Force Committee on Applications and Technology,*

#### Executive Summary

The National Information Infrastructure is envisioned to grow into a seamless web of communications networks, computers, data bases and consumer electronics that will put vast amounts of information at user's fingertips.<sup>1</sup> Crucial to the development of an advanced information infrastructure is the concept of NII "services." Services manage the orderly flow of data and enable and support applications. They are the "glue" that connects the physical network and computing infrastructure with the applications that serve users' needs.

From the consumer's point of view, the capabilities provided by NII services allow users to:

- search, discover, update, transform, and retrieve useful information.
- build and maintain electronic repositories of information.
- create and distribute information electronically.
- execute and record commercial, legal, financial, and other business transactions.
- support collaborative work efforts among collocated or remote individuals.

A pacing factor for the development of an advanced NII is the interoperability and scalability of the services that are implemented within the infrastructure. Many experts believe that the *most* critical and difficult to realize aspect of the NII is the development of a services infrastructure. Without a coherent services infrastructure, access to the NII's advanced capabilities may be extraordinarily difficult and may not be affordable by the average citizen.

No single authority (including the government) has either the knowledge or span of control to develop, mandate or legislate a coherent services framework within which individual commercial competitive solutions can co-exist and interact. An ongoing process of research, development, experimentation and public debate is required. This should be combined with commercial development and product deployment to evolve a services architectural framework and its implementation. Government should provide the leadership and vision to guide this process, to balance the interests of the many NII stakeholders, and to influence the shape of the information infrastructure.

In this report, the services infrastructure issue is addressed and activities to advance the development of NII services are recommended. The Technology Policy Working Group recommends that:



**• Recommendation 1: The Federal Government should increase the priority of research and development in NII services.**

Higher priority research and development areas should address:

- Ease of use to make services accessible by users with widely varying skills, experiences, abilities and backgrounds.
- Interoperability among heterogeneous services.
- Security and privacy technologies to provide cost effective, easy to use services at appropriate levels of security.
- Portability, mobility and ubiquity to enable users access independent of location.

This research would involve advancing the state of technology in such areas as: data and knowledge management, multimedia search and retrieval, human-computer interfaces, language translation, and object technology.

**• Recommendation 2: Government, working within existing governmental processes such as the Committee on Information and Communications and its HPCCIT subcommittee, should develop and implement a coordinated government-wide NII services R&D strategy.**

The services strategy should include the development of pilot applications built on common services that address government problems with significant relevance to the private sector. Development of the services strategy should be via an open process and involve the widest possible industrial and academic communities. The government should encourage and cooperate with industry to advance dialog and activity on creating a coherent services infrastructure.

**• Recommendation 3: A process is needed where the principal government R&D and acquisition agencies, working with industry and other government departments, take the lead to create a common architectural framework for the NII services layer that enables individual commercial competitive solutions.**

The Technology Policy Working Group should continue activity on the development of the process and on identifying critical NII interfaces.



## Introduction

"In the beginning, computers were shipped empty. Each program written for it was loaded independently and occupied the entire machine when it ran. Gradually it became clear that there were common functions used by all programs that ought not be re-written for each new one. They could more productively be included in a common underlying operating system for that machine. This operating system is thus the infrastructure on which we build our current applications."<sup>2</sup>

Today, "computer" is an inadequate description of the systems that connect people to the NII and provide its services. Computers were once thought of as calculating devices. Now, computers linked by communication systems have become information and knowledge providers. These devices are more aptly termed "information appliances" and "information servers." They support communications, information storage and user interactions and incidentally compute.

Information infrastructure technology is changing the way that individuals and organizations work and is restructuring traditional end user-supplier relationships. The technology has the potential of offering a new range of products and services that are far more powerful than existing capabilities. Achieving this potential as rapidly as possible will maintain and extend the nation's competitive edge.

The NII must accommodate a wide variety of users and service providers. This includes end users, service/product suppliers, and builders of applications and services. The relationship between supplier and user is becoming much more complex than in earlier periods. There are no longer neat consumer-supplier relationships. Users have become suppliers and suppliers users, as each adds value by packaging existing products along with their own offerings to create new products and services.<sup>3</sup> For example, a "user" might be a software reseller, an integrator, or a publisher. In each case, the user would receive data or software from another, process this material, and transfer it to others in the distribution cycle where the process could be repeated. The NII must also support fact finding by courts, administrative law judges, and mediators who will be called upon to resolve disputes among the users and service providers.

Not too long from now, the infrastructure will be required to support new applications which must search possibly many large information repositories. Customers and suppliers, using a new generation of information appliances, will access these repositories through high speed networks. A new generation of advanced communication and information access services will be required.<sup>4</sup>

### **NII Services - A Vital Element of an Advanced Infrastructure**

Crucial to the development of an advanced information infrastructure is the concept of NII "services." This concept can be understood best in the context of an NII model which has received widespread recognition.<sup>2</sup> The model consists of three major interconnected layers: "Network Bitways," "Services," and "Applications."



The "Bitways" are the physical infrastructure - the collection of transmission channels such as fiber, cable, satellites and broadcast links and switching devices and computers which interconnect the channels into coherent communications and computing systems. The "Applications" layer represents the capabilities provided to the end user to address specific applications such as providing health care, manufacturing a product, dealing with a crisis, or educating a class of students.

The "Services" layer is composed of those elements of the infrastructure that enable applications or manage the orderly flow of data through the system. Each of the three layers sustains a diverse base of technologies, supports a broad base of suppliers, and can continually increase in capability over time.<sup>5,6</sup>

Services are the glue between the physical network bitways and the applications. Services provide data that can be accessed and shared by more than one application. Services manage the flow of data in the bitways, provide building blocks for applications, and provide the interfaces for displays, sensors, and other input/output devices. NII services provide capabilities for electronic creation and diffusion of information needed to satisfy a diverse set of applications. From the user's point of view, the capabilities provided by NII services center on:

- search, discover, update, transform, and retrieve useful information.
- build and maintain electronic repositories of information.
- create and distribute information electronically
- execute and record commercial, legal, financial, and other business transactions.
- support collaborative work efforts among collocated or remote individuals.

From a supplier's point of view, NII services:

- enable new application product offerings without requiring the creation of all of the supporting software.
- facilitate the encoding and transport of data between locations and between networks.
- translate data from one language representation to another.
- support the migration of existing data files, data bases and programs from older legacy systems to more modern systems.

A service will often originate as part of an application and then migrate to become generic. For example, electronic mail was initially an application. Gradually, the directory, addressing and routing functions separated from the interface and became part of the network services while the interface became the next generation application. Similarly, methods to include sounds, programs and images in E-mail began as application-specific elements and are gradually becoming services.

Interoperability within the services layer is a pacing factor in developing an advanced NII. The presence or absence of interoperability between services will determine whether users or developers must rebuild basic service elements as new applications are developed or alternatively, whether a standard set of interoperable, off-the-shelf



services can be used to create new applications. A report published by the Cross Industry Working Team (XIWT) contained the following observations about applications and services and their relationships:<sup>2</sup>

- Applications will often span more than one domain. For example, a personal planner/organizer application can encompass finance, travel and restaurants.
- Applications will often be built on top of other applications, which in turn, may be composed of still other applications.
- An application, that is originally written for one or two parties, can evolve to a service, as more people and organizations begin to use it.
- Services can either be shared by several applications or be specific to a single application.
- The critical and most difficult to realize aspect of the NII is the development of a services infrastructure.

Services support a variety of activities. Some help users to move and navigate between different networks and information resources. Others simplify applications programming by hiding many of the lower level systems details from the developer. Still other services provide directories such as shopping catalogs, electronic yellow pages, on-line digital libraries and on-line airline flight information.

The NII must have built-in privacy safeguards to allow individuals and companies to conduct business with the confidence that data and information are private, authentic and secure. The services layer must therefore also include services that implement privacy and trust mechanisms as well as defensive software organized to protect the infrastructure from intrusion and attack.<sup>5</sup>

The TPWG, in cooperation with the National Institute for Standards and Technology (NIST) and seven private sector organizations, co-sponsored a forum on "R&D for the NII: Technical Challenges" on February 28-March 1, 1994. This "NII Forum" was attended by more than 300 industry, university and government technology experts who discussed the technical research issues that need to be address in the NII. The results of the workshop are documented in a report entitled "R&D for the NII: Technical Challenges." The NII Forum identified a series of broad technical challenges for developing an information infrastructure with the requisite functionality and performance. Services-related challenges, which must be solved to enable business and individuals full access to the future NII, appear throughout the document and can be summarized as follows<sup>4</sup>:

- The services provided by the information infrastructure must be accessible by users with widely varying skills, experiences, abilities and backgrounds.
- Interoperability among heterogeneous systems is required on an unprecedented scale.
- Security and privacy technologies must be easy to use and must provide appropriate levels of security to suit the requirements, cost constraints and convenience of the end user.



- Information access techniques must enable efficient searches of large distributed information repositories and make a myriad of information resources understandable.
- Multimedia information technologies, including real-time delivery of voice and video, or search and retrieval based on image content rather than textual attributes, must be integrated into information access services.
- Portability, mobility and ubiquity are special technical challenges for the information infrastructure. The NII utility must be as widely available as today's telephone services. Users must be able to move from site to site and still access the NII at either end point or while in transit.

The NII Forum's services-related recommendations are identified in Appendix 2. No organization has defined the full range of services that will be required in the NII. However, a number of the services that will initially be required to populate the services layer have been identified. For example, Table 1 tabulates some of the critical services areas under study by various segments of the research community.<sup>2,4,5,6,7,8</sup>

**Table 1**  
**Representative Critical Services**

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                 |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• <b>Data and knowledge management</b> <ul style="list-style-type: none"> <li>- Knowledge-based search and retrieval</li> <li>- Distributed transaction management</li> <li>- Information resource self-description</li> <li>- Bulletin board and directory services</li> </ul> </li> </ul>                                                                                                                              | <ul style="list-style-type: none"> <li>• <b>Translation/interchange</b> <ul style="list-style-type: none"> <li>- Data format conversion services (including multimedia)</li> <li>- Electronic Data Interchange (EDI)</li> <li>- Electronic Currency Exchange</li> </ul> </li> </ul>             |
| <ul style="list-style-type: none"> <li>• <b>Core Networking Management</b> <ul style="list-style-type: none"> <li>- Identification <ul style="list-style-type: none"> <li>Namespace Management</li> <li>Address Management</li> </ul> </li> <li>- Finding/network resource location</li> <li>- Core communications services <ul style="list-style-type: none"> <li>Transport/Encoding</li> <li>Internetworking/Rate Adoption</li> </ul> </li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li>• <b>Security/Protection</b> <ul style="list-style-type: none"> <li>Authentication</li> <li>Information Integrity</li> <li>Confidentiality/Encryption</li> <li>Access Control</li> <li>Non-repudiation</li> <li>Digital Signature</li> </ul> </li> </ul> |

Other services include billing, capacity management, and "policy based" routing. Services such as those listed above would support the NII and enable many advanced capabilities such as:

- The ability to anticipate a user's needs and assist the user to formulate requests.
- Rapid and content relevant access to globally dispersed multimedia data bases.
- The ability to search large, mobile and distributed information resources and to then extract relevant data in appropriate format and amounts.



## **Why a Coherent Services Architecture is Essential**

A key impediment to the growth of the NII is the time and cost required to develop applications. While developers have shortened the development cycle by building software that is more modular, reusable and interoperable, the dream of being able to develop software efficiently is far from realization. An even more difficult problem will be to interface newer applications with the older, legacy applications of the past.<sup>2</sup>

A problem of significantly greater proportions is inherent in the explosion of applications and services made possible by the propagation of computing and communications. This is the prospect that the NII may develop along lines where developers create multiple systems and applications that cannot interoperate. As a result, most users would find it extremely difficult to find and use NII applications. End users would be required to develop the skills of computer programmers and information infrastructure pilots to find and use data, information and services. This gloomy prospect would defeat the goal of an open infrastructure usable by all of our citizens. It would block access for many, reduce utility for others and require substantially greater efforts and computer related skills and training than can be expected in the general population. Equally threatening, the cost of dealing with non-interoperable systems could make the NII not affordable for many of our citizens.

According to the High Performance Computing, Communications and Information Technology's (HPCCIT) Subcommittee on Information Infrastructure Technology and Applications (IITA), report, services "will form the basis of the ubiquitous 'Information Web' of the 21st century."<sup>5</sup> To achieve this ubiquity, industry needs to evolve an open services architecture that supports the required capabilities. In this way, the benefits of an advanced NII will be available across our society. The challenge is to develop an architecture which can survive technology changes and allows insertion of new technology at any point in the architecture and which makes services accessible and affordable by non-technical users.

## **Evolving a Services Architecture**

Evolving a widely accepted architectural framework for an NII services infrastructure is a critical challenge. The framework would serve as an enabler for the introduction and use of applications. With it, vendors would be able to offer their applications without having to rebuild the supporting software infrastructure. Users would be able to gain access and utility without having to acquire an extensive education in computer sciences or having to build custom links between applications. Defining the essential services and providing the hooks and mechanisms for services to exist, evolve and interoperate are difficult problems at the forefront of the research agenda.<sup>6,8</sup>

Substantial efforts in defining some of the services required for the NII have been made by the HPCCIT for a series of major application areas termed "National Challenge" applications. These application areas include crisis management, health care, manufacturing, education, and government services. For example, in the HPCCIT's IITA focus area, the HPCCIT has defined a set of service classes which includes:

- Universal Network Services



- Integration and Translation Services
- System Software Services
- Data and Knowledge Management Services
- Information Security Services
- Reliable Computing and Communications Services

These are detailed in Appendix 1. However, while there is a substantial correlation of this work with the research suggested by the NII Forum and others, there must be a more general industry discussion of this and other characterizations of services and their applicability to the overall problems of the NII.

Another services related effort has been undertaken by the Object Management Group. The Group, with over 400 industrial members, has developed an "object" representation of programs and data documented in its Object Management Architecture Guide.<sup>9</sup> This architecture addresses issues involved in defining objects, encapsulating them in appropriate ways, and specifying how the objects can communicate.

While "object" technology is seen by numerous groups as the next important step in information systems development, its least understood elements are scalability, security, communications and interoperability.<sup>4</sup> Significant research issues have been identified by the NII Forum in object system foundations, application construction tools, repositories, object brokers, license and payment mechanisms and release and maintenance.

The Computer Systems Policy Project (CSPP), a group of thirteen computer systems suppliers, addressed the interoperability problems related to services but did not examine the overall services architecture issue.<sup>10</sup> The CSPP spelled out required interfaces in four areas: information appliance to network, appliance to application, application to application and network to network. The group emphasized that "openness of these interfaces is essential to allow users to transmit information, enable wide access by users and providers, and stimulate competitive markets for NII products and services. The CSPP recommended that "industry lead the development of standards for interoperability while creating an inter-industry forum on interoperability."

Similar conclusions were reached by an entirely different group made up of representatives of five industry organizations representing the entertainment, electronics, computer and communications industries. This group, in a workshop cosponsored by the TPWG and NIST, was assembled to study the role of advanced digital video in the NII.<sup>11</sup> The group concluded that there is a need for a long-term program involving government and industry to:

- facilitate interface standards,
- address intellectual property rights and information protection,
- fund research and development in interoperable systems

The workshop concluded that additional standards are needed for one- and two-way communications, multicast video services, and internetworking cable, satellite, broadcast, common carrier and packaged media. Standards should address the interconnection and interoperability of digital appliances and devices, digital networks



and channels, software and programs, and third-party services. Creating these standards would require identifying reference points (physical, management, and logical) and interfaces.

The desirability of an overall services architecture was recognized by the National Research Council's NRENAISSANCE Committee.<sup>12</sup> Its report, "Realizing the Information Future," recommended that *"The government must support research into general and flexible architecture as a keystone of its NII research."* The report called for additional research in key middleware services (such as navigation and filtering), including models for organizing and exploiting on-line information, models for managing intellectual property rights, and a framework for electronic commerce. It cited issues in middleware and information services support as being less mature than other components of information networking.

There is strong industry, academic and government endorsement for the additional research and development in NII services and architecture. Two common principles which are implicit in all of the recommendations were explicitly stated by the XIWT. These appear self evident but deserve emphasis:

- A services architecture should support a healthy competitive environment that encourages continuous innovation and improvement.
- The architecture should enable competing services to co-exist, many with the same functionality, some designed to have generic applicability and some targeted to a specific application domain.

The implication of these principles, given the distributed nature of the NII's development, is that no single authority (including the government) has either the knowledge or span of control to develop, mandate or legislate a services architecture. What is needed is an ongoing process of research, development, experimentation and public debate, combined with commercial development and productization to evolve a services architecture and its implementation.

## **The Role of Government**

There is broad consensus about the importance of services for the NII, some of the specific near term services that should be developed, and the need in the long term for a services architecture. There is also strong agreement about the role of government.

The NII Forum recommends a federal research and development program that complements commercial efforts in a way that stimulates and catalyzes further investment from industry.<sup>4</sup> The CSPP<sup>10</sup> believes that the federal government can best support private sector efforts by:

- refining and promoting the vision for the NII and developing a government-industry-public interest partnership to oversee its implementation.
- funding research and development on pre-commercial technologies.
- investing in pre-commercial demonstration projects.
- supporting an industry-led strategy to insure interoperability.



As previously indicated, the NRENAISSANCE Committee<sup>12</sup> recommends that:

- Government must support research into general and flexible architecture as a keystone of its NII research.
- Government should focus its own investments and policy making to gain the maximum leverage and to assure the necessary balancing of interests to make sure that the public interest is met.
- The government role is to provide leadership and vision, balance interests and air competitive differences, and influence the shape of the information infrastructure."

The Technology Policy Working Group agrees with the above conclusions. The TPWG's recommendations, which are given in the following section, are consistent with the above points.

### **Recommendations**

The Technology Policy Working Group concurs with the recommendations of the NII Forum and NRENAISSANCE Committee that the government must support research into NII architecture as a keystone of its NII research. The government should provide leadership and vision and focus its own investments and policy making to gain the maximum leverage to influence the shape of the information infrastructure. The TPWG's recommendations are:

#### **• Recommendation 1: The Federal Government should increase the priority of research and development in NII services.**

Higher priority research and development areas should address:

- Ease of use to make services accessible by users with widely varying skills, experiences, abilities and backgrounds.
- Interoperability among heterogeneous services.
- Security and privacy technologies to provide cost effective, easy to use services at appropriate levels of security.
- Portability, mobility and ubiquity to enable users access independent of location.

This research would involve advancing the state of technology in such areas as: data and knowledge management, multimedia search and retrieval, human-computer interfaces, language translation, and object technology.

#### **• Recommendation 2: Government, working within existing governmental processes such as the Committee on Information and Communications and its HPCCIT subcommittee, should develop and implement a coordinated government-wide NII services R&D strategy.**

The services strategy should include the development of pilot applications built on common services that address government problems with significant relevance to the private sector. Development of the services strategy should be via an open process and involve the widest possible industrial and academic communities. The government should encourage and cooperate with industry to advance dialog and activity on creating a coherent services infrastructure. In particular, it should challenge the private sector to continue efforts such as those begun with the NII Forum<sup>4</sup> to suggest specific research goals and programs and to facilitate technology transition from research and development to implementation and operations. Since government will be a major NII user, services research should also take into account government's unique needs.

**• Recommendation 3: A process is needed where the principal government R&D and acquisition agencies, working with industry and other government departments, take the lead to create a common architectural framework for the NII services layer that enables individual commercial competitive solutions.**

The Technology Policy Working Group should continue its activity on the development of the process and on identifying critical NII interfaces. This work should be included within the TPWG's Standards Project whose goal is to establish a process which leads to a more flexible Government policy for procuring NII products and services. The TPWG Standards Project is addressing the following tasks:

- Identify the key interfaces for standardization which would enable the existing and emerging information infrastructure for communications, computing and entertainment arenas to interoperate.
- Identify the processes (including informal and best practice) being effectively used by these arenas to implement *de facto* and *de jure* standards.
- Identify how the government will describe appropriate standards selected for use within the information infrastructure of the government.



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## APPENDIX 1

### **Representative High Performance Computing, Communications, and Information Technology's Information Infrastructure Technology and Applications (IITA) Tableau of Services**

Universal Network Services: Techniques for improved ease-of-use, "plug and play" network interoperation, remote maintenance, exploitation of new "last mile" technologies like cable TV and wireless, management of hybrid/asymmetric network bandwidth, guaranteed quality of service for continuous media streams, and scale-up of network capabilities to dramatically larger numbers of users.

Integration and Translation Services: These services support the migration of existing data files, databases, libraries, and programs to new, better integrated models of computing, such as object-oriented systems. They also provide mechanisms to support continued access to older "legacy" forms of data as the models evolve. Included are services for data format translation and interchange as well as tools to translate the access portions of existing programs. Techniques include "wrappers" which surround existing elements with new interfaces, integration frameworks which define application-specific common interfaces and data formats, and "mediators" which extend generic translation capabilities with domain knowledge-based computations, permitting abstraction and fusion of data.

System Software Services: These include operating system services to support complex, distributed, time-sensitive, and bandwidth-sensitive applications such as the National Challenges. The services support the distribution of processing across processing nodes within the network, the partitioning of the application logic among heterogeneous nodes based on their specialized capabilities or considerations of asymmetric or limited interconnection bandwidth, guaranteed real-time response to applications for continuous media streams, and storage, retrieval and I/O capabilities suitable for delivering large volumes of data to very large numbers of users. Techniques include persistent storage, programming language support, and file systems.

Data and Knowledge Management Services: These services include extensions to existing database management technology for combining knowledge and expertise with data. These include methods for tracking the ways in which information has been transformed. Techniques include distributed databases, mechanisms for search, discovery, dissemination, and interchange, aggregating base data and programmed methods into "objects," and support for persistent object stores incorporating data, rules, multimedia, and computation.



Information Security Services: These services provide support for the protection of the security of information, enhanced privacy and confidentiality for users of the infrastructure, the protection of intellectual property rights, and the authentication of information sources within the infrastructure. Techniques include privacy-enhanced mail, methods of encryption and key-escrow, and digital signatures. Also included are techniques for protecting the infrastructure, such as authorization mechanisms and firewalls, against intrusion attacks, such as worms, viruses, and Trojan horses.

Reliable Computing and Communications Services: These include system software services for non-stop, highly reliable computer and communications systems that can operate for 7 days a week and 24 hours a day. The techniques include mechanisms for fast system restart such as process shadowing, reliable distributed transaction commit protocols, and event and data redo logging to keep data consistent and up-to-date in the face of system failures.

## **APPENDIX 2**

### **NII Forum - R&D for the NII: Technical Challenges, Services Research Recommendations**

The TPWG, in cooperation with seven private sector organizations, co-sponsored a forum on "R&D for the NII: Technical Challenges" at NIST on February 28-March 1. The forum was attended by more than 300 industry, university and government technology experts that discussed the technical research issues that need to be address in the NII. The results of the workshop are documented in a report entitled "R&D for the NII: Technical Challenges".

The report considered ten technical areas:

1. Network Components and Protocols
2. Information Appliances
3. Information Access
4. Multimedia Information Technologies
5. Infrastructure for Application Development
6. Dependability and Manageability
7. Ease of Use
8. Interoperability
9. Security and Privacy Technologies
10. Portability, Mobility and Ubiquity

Although the Services layer was not explicitly selected as a technical area, reference to services and the functional requirements for services pervades the report. Virtually all of the discussions of Information Access, Infrastructure for Applications Development, and Ease of Use are related to some aspect of the services issues.

In the area of Information Appliances and Servers, the report emphasizes that in the future NII, these units must accommodate extraordinary diversity in protocols, functionality and services, be highly scalable in cost and performance, be highly reliable and must be designed to be evolvable. The report states that techniques for building reliable services from collection of servers will be a considerable issue because of the scale of future systems.

All of the key challenges relating to Information Access are related to services. The challenges were identified as:

- The creation of effective user interfaces that tolerate imprecise requests and make a myriad of information resources understandable.
- The creation of highly efficient, yet effective, methods for searching distributed information repositories to obtain answers to specific queries.
- The creation of large-scale information resources that assist users in understanding their content.



- The creation of architecture's that enable the integration and interoperation of separately designed information resources.

The recommended research and development agenda to address these challenges spans the fields of databases, artificial intelligence, human factors and performance evaluation. Research requirements highlighted are:

- Advanced query languages and capabilities that provide location-independent access, anticipate users' needs and assist the user in formulating precise requests.
- Interfaces capable of adapting to user preferences, limitations and behavior.
- Mechanisms for effective information filtering.
- Sophisticated techniques for optimizing searches of large, mobile and distributed information resources, including capabilities for time-critical delivery of data and for handling conflicting responses or out-of-date data.
- Information repositories that support the above capabilities.
- Translation methodologies, content languages and the development of application-specific ontologies that facilitate the integration and interoperation of multiple information resources.

The key Applications Development challenge highlighted is to create an infrastructure to support low-cost and rapid development of many applications. Specific requirements include interoperability and the need to leverage common solutions for security, dependability, ease of use and distribution over heterogeneous systems.

The recommended approach is to provide functionality in the form of reusable objects that provide services. These objects can be used as software components by application developers. The suggested R&D agenda involves refining this approach and researching the requisite technologies which span the fields of software engineering and distributed computing. Key components of the agenda include:

- Studies on test applications to refine the model of building NII capabilities from coarse-grain objects or services.
- Development of object system foundations including:
  - Primitives for replication and caching of objects while maintaining consistency and managing persistent storage.
  - New (hybrid) models for communication and coordination among the distributed components of an application.
  - Primitives for collaborative applications.
  - Server load-balancing brokers.
  - Visualization and performance tuning tools.

- Application construction tools.

A services related key challenge for developing Ease-of-Use technologies are developing interfaces that provide all users with equivalent access to information despite differences in their skills, experience and cognitive capabilities. The recommended research and development agenda to address this issue spans the areas of psychology, sociology and user interfaces. Recommendations include:

- In-depth psychological, social and cultural study of NII users to understand how individuals can to navigate through the NII and to understand how to support various levels of multi-user collaboration.
- Metrics and methods for evaluating the ease of use of NII applications and services.
- Development of a core set of user interface standards to enable easy-to-use services across different platforms.

The highlighted goal of Interoperability research and development efforts is to enhance the ability to compose systems into a single acceptably seamless system. To achieve this goal, we must identify and define common generic and application-specific services that provide a range of functionality and develop mechanisms for making these services widely available in the "NII operating system."

Research in a variety of system wide security issues including the development of a well-specified security architecture that facilitates both mandatory and discretionary security, risk assessment and extensions as NII services and capabilities expand. Mechanisms for security management across network and national boundaries are needed as is research in core security services, such as authentication, encryption, authorization and anonymous access, that scale to billions of users and/or terabit data rates.



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**UNITED STATES DEPARTMENT OF COMMERCE**  
**National Telecommunications and**  
**Information Administration**  
Washington, D.C. 20230

## **IITF COMMITTEE REPORT**

**September 12, 1994**

**IITF:** The fifth Information Infrastructure Task Force (IITF) meeting, chaired by Secretary of Commerce Ronald Brown, will be held on October 4, 1994, in Room 4830 at the Department of Commerce, from 1:00 - 3:00 p.m.

**NII Advisory Council:** On September 13, the NII Advisory Council (NIIAC) will hold its fifth meeting at the New York Public Library, Celeste Bartos Forum, in New York City, from 8:30 a.m. to 4:00 p.m. The NIIAC will be addressed by Secretary Brown and the meeting will focus on the status of the individual Mega-Project work plans. The three Mega-Projects (Vision and Goals; Access; and Privacy, Security, and Intellectual Property) will meet on September 12 at Columbia University's Shapiro Center for Engineering and Physical Science Research, New York, New York. Secretary Brown and members of the NIIAC will also visit the Bunche School on September 12 to see how students are using the NII.

**Applications Conference:** On September 7 and 8, the Council on Competitiveness and the IITF co-sponsored an applications conference entitled "Breaking the Barriers to the National Information Infrastructure." The conference was held at the ANA Hotel in Washington, D.C., with an attendance of over 600 people. The conference explored a range of applications being developed for the NII, with a special focus on obstacles faced by both developers and end users of such products.

**National Information Infrastructure Symposium:** On October 17-19, the President's National Security Telecommunications Advisory Committee (NSTAC) and the Office of Science and Technology Policy will hold a symposium at the U.S. Naval War College, Newport, Rhode Island. The purpose of the symposium is to provide an opportunity for senior members of the Administration to meet with industry leaders to discuss key national security issues related to the NII.

This is the tenth monthly Information Infrastructure Task Force (IITF) Committee Report produced by the NII Secretariat at the National Telecommunications and Information Administration (NTIA) at the Department of Commerce. Please submit Committee and Working Group approved minutes of meetings, schedules of upcoming events, and any information regarding the IITF Committee Report to Yvette Barrett, 202/482-1835 (office), 202/482-0979 (fax) or ybarrett@ntia.doc.gov (e-mail).

Information regarding the IITF Bulletin Board System (BBS) should be submitted to Charles Franz at NTIA either via e-mail (cfranz@ntia.doc.gov) or floppy disk in Word Perfect or ASCII formats. The IITF Bulletin Board can be accessed through the Internet by pointing your Gopher Client to iitf.doc.gov or by telnet to iitf.doc.gov and login as gopher. The Bulletin Board is accessible at 202/501-1920 using a personal computer and a telephone modem.



## **Committee on Applications and Technology**

The efforts of the Committee on Applications and Technology (CAT) during August focused on completion of the second set of NII Application Papers, increasing dissemination of the NII Inventories, continuing work of the budget cross-cut process, and meetings of the working groups.

During the public portion of the September 9 meeting, Jim Hake of the National Infrastructure Campaign and representatives from the Mayo Clinic provided interesting presentations on the NII awards and the health care applications in the NII.

IITF approval of the second set of CAT application papers in July, prompted final production and publication of "The Information Infrastructure: Reaching Society's Goals." This second set of application papers features "quality of life" areas that include: Americans with Disabilities; Supply and Demand of Electric Power; Improving Transportation; Promoting Telecommuting; Effect on Emergency Management; Public Empowerment with Environmental Information; Arts, Humanities, and Culture; and Public Safety. The IITF Chair, Ronald Brown, released this publication at the "Breaking the Barriers" conference on September 7.

CAT has also uploaded the Information Infrastructure Inventories to World-Wide Web, gopher, and ftp services, to provide wider dissemination via Internet services. These inventories include NII Application Projects and Telemedicine funding sources. Updates to the Application Projects inventory will be completed in September.

CAT continued coordination of the IITF budget cross-cut activity. The final submissions from agencies are due by September 16, and the IITF will review the report at its October 4 meeting.

The Government Information Technology Services (GITS) Working Group, chaired by Jim Flyzik, met on August 9 at the Federal Trade Commission. During August, the GITS finalized both the Vision Statement and the GITS Action Plan for release in early September. During the month, empowerment letters were issued to agencies to proceed with GITS related activities associated with private network consolidation, establishment of an international trade base, integrated government financial filings, and development of an environmental data index. As part of the GITS outreach program, GITS also obtained approval for the Telecommunications/Information resources panel charter. The Customer Service Improvement Team, U.S. Postal Service, and a cross-section of industry and academia met earlier this month to discuss improving government information and services.

The Technology Policy Working Group (TPWG), chaired by Duane Adams, held a TPWG meeting on August 18, as well as numerous project group meetings during the month. Two reports were finalized: "Services and the National Information Infrastructure" report for CAT review and IITF approval, and the "Advanced Digital Video in the NII." Both are



available on the IITF World-Wide Web and gopher services. The TPWG accelerated work on the NII Roadmap by engaging the National Research Council to undertake the project, Dr. Lewis Branscomb was named as Chair. Interaction with the American National Standards Institute (ANSI) Information Infrastructure Standards Panel (IISP) continued, and the TPWG has proposed co-sponsoring a workshop on critical NII interfaces to be held in late fall or early winter. The next TPWG meeting is scheduled for September 12 at ARPA, in Room 970, from 3:00 to 5:00 p.m.

The Health Information and Applications Working Group (HIAWG), chaired by John Silva, finalized an initial draft inventory of federally funded activities related to consumer health information. This inventory will lead to recommendations regarding the priority of federally sponsored consumer health information and applications to the improvement of the health of all Americans. In addition to this inventory, the Telemedicine subgroup completed the "Telemedicine Funding Sources" inventory which is now available on the IITF Information Server. The HIAWG Telemedicine subgroup held a working conference on "Telemedicine Policy for the NII" with the Senate/House Ad Hoc Steering Committee on Telemedicine and Health Care Informatics. Facilitated dialogues and break out sessions resulted in a conference report which will concentrate on key issues in the following areas: utility to people, regulatory issues, standards, and evaluations. The conference report will be made public in a variety of forums in September. The HIAWG has continued to collect public responses to the application paper titled "Health Care and the NII," which was a part of the CAT report "Putting the Information Infrastructure to Work." A second, broader white paper on health and the NII is expected to be drafted in collaboration with the original author and representatives from the private sector. The next HIAWG meeting is scheduled from 2:00 to 4:00 p.m. on October 3 in the Humphrey Building at the Department of Health and Human Services.

### **Telecommunications Policy Committee**

The Telecommunications Policy Committee (TPC) last met on July 14 at the Department of Commerce. TPC has been helping to plan events for the NII anniversary in September and working on the NII Progress Report. The Committee will meet next on Wednesday, September 14, from 3:00 to 5:00 p.m. in Room 1414 of the Department of Commerce. During the public portion of the meeting, the TPC will hear the issues and concerns of the cable industry in the building the NII. Decker Anstrom, President of The National Cable Television Association, will lead the presentations. In order to register, please contact Tatia Williams at 202-482-1551 or [twilliams@ntia.doc.gov](mailto:twilliams@ntia.doc.gov).

The Legislative Drafting Task Force continues to hold daily conference calls and meets frequently to discuss legislative policy issues and strategy. By a vote of 423-4, the House of Representatives passed H.R. 3636, the bill addressing local competition issues. The House also passed H.R. 3626, modifying restrictions on the Bell Operating Companies, by a vote of 423-5. On the Senate side, the Commerce Committee reported out S. 1822, which includes



long distance and local competition issues, by a vote of 18-2. Senate floor action is anticipated in September.

The Universal Service Working Group last met on Monday, July 25, at the Department of Commerce. The Working Group provided comments on a draft of the Notice of Inquiry on Universal Service, which will be released in mid-September along with the summary report, "The NII Field Hearings on Universal Service and Open Access: America Speaks Out."

The International Working Group, chaired by Carol Darr, held a public hearing entitled "The Emerging Global Information Infrastructure" on July 27 and 28. Approximately 250 people attended to listen to 29 panelists, representing service providers, users, industry associations, and equipment and software manufacturers. Panelists testified on new technologies, the status of the world's information infrastructure, the five GII principles (private investment, competition, open access, universal service, and regulatory flexibility), and how best to develop a GII. A transcript of the hearing is now available on the NTIA electronic bulletin board and in hard copy in the Department of Commerce Law Library (15th and Pennsylvania Avenue, NW).

NTIA received 21 written comments in addition to the comments of those who testified orally. Both written and oral testimony are being analyzed for incorporation into the Agenda for Cooperation, the Administration's principles and goals for development of the GII.

In addition, the subworking group on U.S. Aid and Telecommunications under the Working Group on International Telecommunications is working on a final version of a report on U.S. government, private sector, non-profit, and academic contributions to communications development. The report provides a comprehensive overview of the wide range of activities through which the United States supports international communications development.

### **Information Policy Committee**

The Information Policy Committee (IPC) last met on June 15 to hear the progress reports from its Working Groups, to review the intellectual property rights report, and to be briefed on the NII Security Issues Forum. The IPC includes the Government Information Working Group, the Intellectual Property Rights Working Group, and the Privacy Working Group.

The Government Information Working Group (GIWG), in cooperation with the Bauman Foundation and other leading foundations, and with the assistance of the President's Council on Sustainable Development, is seeking ways to use emerging electronic information dissemination technologies to support sustainable development.

The Bauman Foundation is sponsoring a study of these needs. The first step is to identify specific federal information dealing with sustainable development that should be disseminated. This includes such data sources as economic, environmental, health, and



education indicators. Next, the study will identify gaps in information access and dissemination, particularly among disadvantaged communities. Finally, it will examine the technical and policy needs associated with providing and using the information. The study and recommendations are expected to be completed by November.

The GIWG, in coordination with the Office of Science and Technology Policy, has chartered an interagency group to consider the development of effective information dissemination management systems addressing the particular problems of scientific and technical information. The group will review the implementation of OMB Circular No. A-130 for federal scientific and technical information within federal agencies with a view towards identifying and sharing "best practices" in information dissemination management. In addition, the group may determine whether additional implementation guidance would be useful in view of rapidly emerging technology and the development of the National Information Infrastructure. The group's report and recommendations are due in March, 1995.

**Electronic Government and Electronic Rulemaking:** In addition to electronic information dissemination, the government can make good use of electronic information collection initiatives to improve its processes. One example is an initiative on electronic rulemaking jointly sponsored by the Regulatory Working Group established by OIRA and the GIWG. Co-Chaired by White House Staff Secretary John Podesta and HHS Chief of Staff Kevin Thurm, the group seeks to develop policies and practices for improving federal regulation by instituting electronic notice and comment rulemaking. The group is examining legal and policy issues associated with electronic rulemaking, collecting specific examples of success stories, and encouraging agencies to promulgate specific procedures to govern their electronic rulemaking initiatives.

**Delegation of Paperwork Authority to the FCC:** As a result of an NPR recommendation, and under the authority of the Paperwork Reduction Act, OMB issued guidance to delegate the review of routine paperwork back to agencies. As a result, the Federal Communications Commission has requested from OMB delegation of paperwork approval authority for certain information collections. This pilot effort is the first step in empowering agencies in this area and will serve as a model for the entire Federal government.

The Electronic Record FOIA Legislation Group, an interagency working group, chartered by OMB, has met weekly throughout the summer and developed a set of principles relevant to the electronic issues surrounding the Freedom of Information Act (FOIA). Although the FOIA already covers records maintained in electronic form, the Act should be updated to reflect the demands of the information age and current case law. The principles will soon be distributed to the agencies and available to the public and will form the basis for legislative action.

The Government Information Locator Service (GILS), a major initiative to implement the information dissemination policies of recently revised OMB Circular A-130, will supplement



but not replace other commercial or agency information dissemination mechanisms by identifying public information resources throughout the Federal Government, describing these resources, and providing assistance in obtaining information. A final report describing the Government Information Locator Service (GILS) has been approved by the members of the IITF, presented to the National Information Infrastructure Advisory Council (NIIAC), and is available to the public.

OMB will soon issue a bulletin to the agencies setting forth timetables and procedures for implementing GILS. Technical specifications were proposed by NIST July 5, 1994, and comments are due October 5, 1994.

The public will be served by GILS directly or through intermediaries such as the Government Printing Office (GPO), the National Technical Information Service (NTIS), Federal Depository Libraries, and other public libraries. On-line access to GILS will be via kiosks in malls, 800 numbers, electronic mail, bulletin boards, facsimile transmission, and through off-line media such as floppy disks, CD-ROM, and printed materials. GILS locator information will be accessible on public networks without charge to direct users.

The Privacy Working Group has proposed revisions to the 1973 Code of Fair Information Practices in order to update it for the electronic era. The revisions will form the basis for actions, policies, and legislation to protect the privacy of individuals while allowing for the reasonable flow of information. These proposed revisions, in the form of a Statement of Principles for Providing and Using Personal Information, have been approved by the IITF. They have also been submitted to the NIIAC and released for public comment and review.

The Intellectual Property Rights Working Group released a draft report regarding the effect of the National Information Infrastructure on intellectual property rights on July 7. The Group is holding hearings on September 14 in Chicago, September 16 in Los Angeles, and September 22 and 23 in Washington, D.C., to solicit public comment on the report and to initiate a dialogue on public education about the importance of intellectual property in the context of the NII.

### **NII Security Issues Forum**

The NII Security Issues Forum coordinates security efforts-- defined as confidentiality, integrity, and availability--across the IITF. Sally Katzen, chair, held the fifth meeting of the Forum on Wednesday, August 10. The agenda included: (1) discussion of the July 15 public meeting on Security and the NII, (2) discussion of strategy for additional meetings, and (3) progress reports from other groups addressing related security issues.

In coordination with the NII Advisory Council's Mega-project on Security, Intellectual Property, and Privacy, a series of follow-up meetings between government officials and representatives from the private sector has been proposed. Six key sectors have been



selected as the topic of each meeting: (1) entertainment, computer software, and publishing, (2) health and education, (3) finance and insurance, (4) transportation, energy, and commerce, (5) government to citizen operations; and (6) public, commercial network systems.

The first such meeting has been tentatively set for October 18, 1994, in Silicon Valley, California, where the focus will be on the intellectual property rights implications of the NII for the entertainment, software, and publishing industries.

The NII Security Issues Forum is also working on a training proposal for government information systems security managers.

**Security of Federal Automated Information Systems:** Appendix III of OMB Circular A-130, "Security of Federal Automated Information Systems," was issued in 1985. It requires Federal agencies to establish computer security programs and defines a minimum set of controls to be incorporated into those programs. Since then, newer technology requires that security controls be updated. Based on an NPR recommendation, OMB plans to issue for agency comment a revised Appendix this fall.

#### **Schedule of Upcoming Events**

**September 12:** Technology Policy Working Group  
ARPA  
3:00 p.m. - 5:00 p.m., Room 970

**September 14:** Telecommunications Policy Committee  
Department of Commerce  
Room 1414  
3:00 p.m. - 5:00 p.m.  
(Open to public at 3:45 p.m.)

**September 28:** Network Reliability and Vulnerability Working Group  
DISA Headquarters  
1:00 p.m. - 4:30 p.m.

**September 29:** Technology Policy Working Group  
ARPA  
3:00 p.m. - 5:00 p.m., Room 970

**October 3:** Health Information and Applications Working Group  
Department of Health and Human Services  
Humphrey Building  
2:00 p.m. - 4:00 p.m.



- October 4:** Information Infrastructure Task Force (IITF) Meeting  
Department of Commerce  
1:00 p.m. - 3:00 p.m., Room 4830
- October 11-13:** Interchange '94  
Renaissance Hotel and Washington Convention Center  
Washington, D.C.  
(Co-sponsored by the GITS Working Group, the Federation of Government Information Processing Councils, Public Technology Inc., and the State Information Policy Consortium)
- October 17-19:** National Information Infrastructure Symposium  
U.S. Naval War College  
Newport, Rhode Island  
(Co-sponsored by the President's National Security Telecommunications Advisory Committee (NSTAC) and the Office of Science and Technology Policy)
- October 20:** Technology Policy Working Group  
ARPA  
3:00 p.m. - 5:00 p.m., Room 970
- October 27:** Committee on Applications and Technology  
Department of Commerce  
9:30 a.m. - 11:45 a.m., Room 4830  
(Open to public 10:45 a.m.)



**THE CLINTON ADMINISTRATION'S  
INFORMATION INFRASTRUCTURE TASK FORCE**

**Chair: Ronald H. Brown, Secretary of Commerce**  
**Government – Internal Minutes of the July 26, 1994 Meeting**

**TIME AND PLACE:** 2:00 p.m., Indian Treaty Room, Old Executive Office Building

**PURPOSE:** To demonstrate a broad commitment to the Administration's goals outlined in The National Information Infrastructure: Agenda for Action and to achieve consensus on Task Force work plans and draft documents.

**SUMMARY OF THE MEETING**

**OPENING REMARKS**

Secretary Ronald H. Brown opened by welcoming everyone to the fourth meeting of the Information Infrastructure Task Force (IITF). He stated that Vice President Gore would not be able to attend the meeting but that the two had met earlier in the day and the Vice President remains very involved in NII issues.

Secretary Brown noted that the contribution and efforts of the Task Force members have had a significant impact not only on telecommunications, but also on the future of the economy. The NII has helped foster an infrastructure and an environment for sustained economic growth for high wage, high quality jobs for the American people, which is an important goal of this Administration.

Secretary Brown asked that everyone in the room identify himself or herself and noted the increased number of attendees at the meeting.

**IITF OVERVIEW**

In his introductory remarks, Secretary Brown focused on the accomplishments of the IITF. He noted that the first series of NII Application Papers had been released in early May and the second series will be released in early September.

Secretary Brown stated that the Intellectual Property Working Group, chaired by Bruce Lehman, Commissioner of the Patent and Trademark Office, released its "Intellectual Property and the NII" report a few weeks ago. The report is significant and has received positive responses from industry, nonprofits, and individuals. Secretary Brown observed that the report addresses complicated issues such as the definition of publication in the digital computer age.

Secretary Brown noted that the IITF Committees conducted several public meetings including one on the role of small and minority businesses in the NII, and one on NII security issues.

He also highlighted several major events that will take place in September to mark the one year anniversary of the Agenda for Action: (1) the "Breaking the Barriers to the NII" application conference co-sponsored by the Council on Competitiveness and the IITF scheduled for September



7-8; (2) the release of several draft reports for public comment; (3) the announcement of the first Telecommunications Information Infrastructure Assistance Program (TIIAP) grant recipients; (4) the initiation of a budget cross-cut analysis report; (5) the unveiling of the White House Web Server; and (6) the release of the NII Accomplishments Report. Secretary Brown closed by recognizing the fact that many of the departments have been working to notify the public of their endeavors.

## **GLOBAL INFORMATION INFRASTRUCTURE (GII) REPORT**

Secretary Brown began his discussion of the GII by recalling a meeting a year ago in Venezuela with the Telecommunications Ministers from Latin American countries where the GII discussion really got underway. He noted that since Vice President Gore's speech, given in Buenos Aires where he advanced the concept of an international network of networks, we have been working on how to facilitate the cooperative development and implementation of the GII. The topic was also discussed earlier this month in Brazil, Chile, and Argentina. In Chile, the United States and Chile signed a Memorandum of Understanding (MOU), which was the first concrete step in developing a GII.

The primary goal of a GII is to provide citizens and businesses with greater access to information, in turn spurring economic growth and increased cooperation among nations. At the G-7 Summit in Naples, a commitment was made for a meeting of G-7 nations' Telecommunications Ministers, and possibly their Ministers of Industry and Economy. Secretary Brown will lead that meeting, which will be held in Brussels early next year.

Secretary Brown announced that the International Telecommunications Working Group's public hearing will be held at Georgetown University on July 27-28. The public hearing will address the international aspects of the NII. Testimony from the hearing will be used in drafting a report entitled, Global Information Infrastructure: Agenda for Cooperation. This report will set forth the Administration's vision and objectives of the GII. Secretary Brown hopes to meld long term policy interests and realistic business decisions together in developing the GII.

Carol Darr, chair of the International Telecommunications Working Group, stated that the Global Information Infrastructure: Agenda for Cooperation hopes to draw from as many countries and agencies as possible. Ms. Darr requested that everyone forward relevant documents that would have significant impact on the report to the Office of International Affairs at NTIA.

## **CONNECTIVITY UPDATE**

James Flyzik, Director of Telecommunications Management for the Department of Transportation and Chair of the Government Information Technology Services Working Group, provided an update on connectivity.

First, Mr. Flyzik reported that the Electronic Benefits Task Force report had been released in May during a press conference with the Vice President. Three states -- Texas, South Carolina, and Mississippi -- are establishing prototypes for food stamp distribution, and national laboratories are developing smart card technology.



Second, he described an integrated tax initiative called the "Simplified Tax and Wage Reporting System." This initiative will allow business people that currently submit reports to several agencies to integrate their reporting into a "harmonized wage code." Joint treasury, social security, and labor filings will also streamline this process.

Third, the International Trade Data System will include Mosaic or a similar interface to allow United States businesses to advertise exports to the rest of the world. Advances in connectivity also have occurred as a result of the following activities: (1) the National Law Enforcement Wireless Initiative; (2) increased federal, state, and local coordination, such as the cooperation between U.S. Customs Service, the Department of Justice, and state and local agencies to connect Hawaiian islands by a microwave background; (3) GITS's ensuring that the follow-on contract to FTS2000 is consistent with the principles of the NII; (4) the E-Mail Report, released on April 1, 1994; (5) the National Archives and Records Administration's rules for record-keeping; (6) GSA's efforts to establish an office in GSA for e-mail; (7) an "800" number initiative which increase access to government; and (8) NTIS' planned expansion of on-line publication, FedWorld.

Mr. Flyzik informed the group that many of these activities will be demonstrated in October in Washington at an event called Interchange '94.

David Lytel, of the Office of Science and Technology Policy, then gave a demonstration of the White House World Wide Web Server Program. Dr. Lytel explained how it supports multimedia and hypertext.

Dr. Lytel reported that the Web-Server currently is available only to government employees with access to World Wide Web or Mosaic. It will be available to the public when the Vice President releases it in September as part of the anniversary of the Agenda for Action. The demonstration can be transported on the road easily, and interested agencies should contact him, Jock Gill or Tom Kalil for information.

Secretary Brown thanked Dr. Lytel for his demonstration. He noted that the large number of departments represented on the Web Server demonstrates a significant increase in connectivity. Tom Kalil thanked NASA and the National Science Foundation for their assistance and support in getting the White House on-line, and he credited the University of Illinois at Champagne for their software development.

## **FY96 BUDGET PROCESS STATUS REPORT**

Arati Prabhakar, Director of the National Institute of Standards and Technology (NIST) and Chair of the Committee on Applications and Technology, provided a brief overview of the FY96 budget cross-cut process. Dr. Prabhakar stated that this process will serve as a vehicle for agencies to gain priority for particular projects that will facilitate implementation of the NII. It will identify budget initiatives and serve as a mechanism for coordinating the technology programs that relate to the NII. The IITF will be focusing on specific application areas and has recruited individuals to help coordinate and pull together the budget initiatives across the government in different areas, such as electronic commerce, education, government applications, health care, libraries, manufacturing, environmental, and transportation. Dr. Prabhakar requested full agency and department participation to ensure success of the Administration's NII vision.



By the next IITF meeting, Dr. Prabhakar hopes to have a set of budget initiatives to be endorsed by the IITF. September 16 is the deadline for submissions of agency updates and the deadline for submission from the IITF to OMB is October 24, 1994.

## **IITF COMMITTEE REPORTS AND APPROVAL OF WORK PLANS**

### **Telecommunications Policy Committee**

Larry Irving, Assistant Secretary for Communications and Information and Chair of the Telecommunications Policy Committee (TPC), reported that the Committee had met three times since the last IITF meeting. In an effort to enhance outreach efforts, TPC has expanded its meeting to include a second hour open to the public providing presentations on NII issues and concerns important to its constituency. Several issues addressed at the public meetings included the role of small and minority businesses in the NII, the public interest community's recent redlining study, the impact of telecommunications and information technology on employment and other labor issues. In September, the TPC will invite the cable industry to discuss its participation in the NII. The TPC will also assist NTIA in holding a state and local regulatory conference in the fall.

The TPC has assisted NTIA with additional public hearings on universal service and open access. Mr. Irving gave an overview of the last three hearings conducted in Durham, North Carolina; Sunnyvale, California, and Indianapolis, Indiana. The hearing boards consisted of Deputy Secretary of Commerce David Barram, FCC Commissioner Andrew Barrett, members of state public utility commissions, and Assistant Secretary Larry Irving. Each hearing also featured technology demonstrations, ranging from multimedia applications to tele-radiology software.

The Universal Service Working Group will publish a Notice of Inquiry (NOI) about universal service and open access issues in the Federal Register in late August. The Working Group will also conduct a "virtual" hearing on universal service in mid-September. The Group will continue to assist NTIA in surveying telecommunications facilities in public institutions, including schools, hospitals and libraries.

In order to explore the evolving GII, the International Telecommunications Working Group will conduct a public hearing on July 27-28, Secretary Brown will open the hearing. The purpose of the hearing is to obtain private sector input on international telecommunications issues as we begin to draft the Agenda for Cooperation. The Working Group will continue to examine the following issues: international standards, technology transfer, and U.S. aid and telecommunications.

The Network Reliability and Vulnerability Working Group has received several presentations regarding telecommunications legislation, NSA Mosaic programs, FCC Network Reliability Council, NIST Security Standards Programs, the Alliance for Telecommunications Industry Solutions, and review of NII security issues. In addition, the Working Group has established four new subgroups to address the following issues: (1) reliability for general users, (2) national security and emergency preparedness, (3) protection of the network, and (4) an Integrating Group.

The Legislative Drafting Task Force continues to work on the Administration's telecommunications legislative reform initiatives. H.R. 3636, the National Communications Competition and Information Infrastructure Act of 1994, referred to as the Markey-Fields bill, passed by an overwhelming vote of 423-4 on the House floor. H.R. 3626, the Antitrust and Communications Act of 1994, which covers



the Modified Final Judgment (MFJ) decree and other antitrust provisions passed 423-5. At the time of the meeting, the IITF was waiting for the Senate to mark-up S. 1822. Mr. Irving acknowledged that there was an impasse involving the Regional Bell Operating Companies (RBOCs) access to the long distance market.

#### Committee on Applications and Technology

Arati Prabhakar, Chair of the Committee on Applications and Technology, began her report with a reminder about the "Breaking the Barriers to the National Information Infrastructure" conference that will be co-sponsored by the IITF and the Council on Competitiveness on September 7-8 at the ANA Hotel in Washington, D.C. The conference will feature demonstrations and substantive discussion of NII applications.

Dr. Prabhakar noted that at the last IITF meeting the Committee on Applications and Technology had received approval of the first set of applications papers. Since those papers were put on-line, they have been accessed frequently by users. The Committee is now working on its second set of applications papers with the general theme focusing on "the quality of life."

Dr. Prabhakar observed that Mr. Flyzik had already reported on the activities of the Government Information Technology Services Working Group.

Dr. Prabhakar reported that the Technology Policy Working Group has been focusing on NII road maps, NII service activities, and standards process. Interoperability also has been an important issue. It is becoming apparent that the traditional standards-setting process may be inadequate. The Working Group, NIST, and Harvard University's Kennedy School of Government co-sponsored a conference on standards development in the information infrastructure in mid-June.

The telemedicine subgroup of the Health Information and Applications Working Group is completing its work plan and hopes to have a report in the near future.

Undersecretary of Commerce Dr. Jonathan Baker of NOAA proposed establishing a fourth working group under the Committee on Applications and Technology focusing on environmental information. Dr. Prabhakar agreed to consider such a proposal and asked interested parties to contact her.

#### Information Policy Committee

Sally Katzen, Administrator of the Office of Information and Regulatory Affairs, Office of Management and Budget, and Chair of the Information Policy Committee, started her discussion with the Intellectual Property Report. The report, prepared by the Intellectual Property Rights Working Group, sets forth the legislative changes, and educational initiatives that may be appropriate to ensure adequate protection of intellectual property rights in the NII. It also proposes minor changes to the Copyright Act. It was issued in draft form for comments, which were generally favorable. Some commenters noted that there should be greater emphasis on technical approaches to protecting intellectual property rights. Bruce Lehman, Commissioner of the Patent and Trademark Office and Chair of the Intellectual Property Rights Working Group, will expand on this issue in the report's final form. The draft is out for public comment, and hearings on the subject will be held in Washington,



D.C., Chicago, Los Angeles, and Mountain View, California throughout the fall. In addition, there will be another opportunity for internal comments following the public comment period.

The Government Information Working Group and NIST published information about the Government Information Locator Service (GILS) in the Federal Register on July 5, 1994. Comments are due by October 3, 1994. A bulletin from the Office of Management and Budget (OMB) due this fall will establish a deadline for agencies to inventory their databases and begin implementation. The Committee hopes to release the final GILS report by early November. So far, a draft of the bulletin and public comments on the draft have been received. The draft is also on-line on FedWorld and the IITF bulletin board service (BBS). The FedPage will also have links to GILS. As a preliminary step, the Department of Commerce is putting on prototype information.

The Privacy Working Group is continuing to work on its Principles for Providing and Using Personal Information. Most of the comments have been positive. The comment period has been extended in order to accommodate intense interest in this issue. The Group is also reviewing the Principles against the original 1973 Code of Fair Information Practices in order to ensure that, as the Code is updated for the electronic age, no principles which are generally pertinent to information use are forgotten.

#### NII Security Issues Forum

Secretary Brown commented that there is a significant need to pay attention to security issues. In February, the Secretary had asked Ms. Katzen to coordinate on the Administration's efforts on security issues. Secretary Brown also noted that earlier this month the Advisory Council co-sponsored a public meeting regarding security issues relevant to public institutions such as schools and libraries. The meeting was well-attended.

Ms. Katzen began her report by thanking people for participating in a public meeting held by the NII Security Issues Forum the previous week. During that meeting, the Forum heard from representatives of many sectors. It became clear that security is an important public issue, particularly issues such as the risk of systems crashing and the protection of confidentiality of information carried on networks. The variety of needs discussed demonstrates that one size will not fit all in the security arena. As a first in initiating ongoing public dialogue, the meeting focused on defining user needs, and not answers. In general, there was more discussion of policy than of technology. Most importantly, the meeting served to begin a dialogue on these issues between the public and private sectors.

Linda Roberts of the Department of Education inquired as to whether there had been any discussion about limiting the information that is accessible to young people. She wanted to know if there are any thoughts about how to keep children out of some on-line discussion groups. Ms. Katzen responded that the issue of access by children had not been raised. The meeting had focused very little on First Amendment issues. Some of the questions, such as how do you apply time, place, and manner restrictions in cyberspace, are very difficult. Ms. Katzen suggested that these problems might be addressed through Netiquette and Net policing. Ms. Roberts replied that the issue of access for children should be addressed because it might cause some people to be unwilling to participate in the NII. Thus, the negative implications might dominate the good uses of the network.

Michael Nelson of the Office of Science and Technology Policy commented on the recent press coverage of the Administration's encryption policy, stating that Vice President Gore's letter to



Representative Cantwell was a clarification of current Administration policy. Dr. Nelson noted that the clipper chip is voluntary and exportable, and was approved as a standard in government telephones only. He also stated that the Administration will continue to explore, in cooperation with industry, alternatives which meet privacy, law enforcement, and national security needs.

#### Approval of Committee Work Plans

The Task Force approved the work plans of the IITF's three Committees: Telecommunications Policy, Applications and Technology, and Information Policy.

### **DISCUSSION AND APPROVAL OF IITF DOCUMENTS**

Secretary Brown discussed the Government Information Technology Services (GITS) report. He said that the first part summarizes the status of the use of information technology in government, from the perspective of the customer. This perspective is drawn from the National Performance Review (NPR). The first part also describes the GITS Working Group's structure and position to meet its goals. The second part of the report outlines the specific actions established to meet each NPR recommendation.

Secretary Brown then turned to Mr. Flyzik for additional comments on the GITS report. Mr. Flyzik stated that the report is about the fact that the NPR discovered that, despite the success of government in getting on-line, the customers (citizens) perceive that the government is still paper-based, uncoordinated among agencies, and lagging behind the private sector. The report attempts to correct this perception by identifying what has been done in the government and discussing future plans. The first part discusses the mission and structure of GITS, the concept of the GITS Champion, the Office of Primary Responsibility, and various support organizations that will participate in the process.

The second part of the report -- the Action Plan -- discusses how the goals will be implemented. In addition to the efforts of the GITS Working Group, the report contains input from a series of sessions with industry representatives that do business with the government. These sessions included both separate and integrated brainstorming meetings. Based on the idea that industry-government partnerships are necessary for the NII, this report was planned jointly. The Working Group plans to issue new Action Plans on a quarterly basis.

Debra Knopman, of the Department of the Interior, mentioned that she was concerned that some agencies had not participated in the process. Mr. Flyzik responded that there would be opportunities for review through the Federal Information Resources Management Policy Council (FIRMPC) and the Interagency Management Council, and that interested parties are welcome to contact the Working Group if they wish to participate. Also, some of the agencies that are not represented in the Working Group might be represented by support groups.

The IITF approved the release of the strategic report for public comment.

Secretary Brown then turned to Mr. Irving to discuss the draft summary report "The NII Field Hearings on Universal Service and Open Access." The report includes the major themes featured during the hearings, highlights of the demonstrations, and profiles of the witnesses and attendees.



Mr. Irving commented that staff has traveled outside the beltway to hear from a new set of voices, such as rural doctors and Navajo Indians living where the telephone penetration rate is very low. Over the course of the hearing, approximately two hundred and fifty people had offered oral testimony and twenty-seven people submitted written testimony. This provides a foundation for the universal service Notice of Inquiry that is being prepared.

The IITF approved the release of the "The NII Field Hearings on Universal Service and Open Access" report for public comment.

## **DISCUSSION OF NII FIRST ANNIVERSARY ACTIVITIES**

Secretary Brown observed that September will mark the one-year anniversary of the release of the Agenda for Action and the establishment of the IITF. The IITF Secretariat is therefore planning to release a report on what has been accomplished during the first year. He stated that one of the reasons that the Administration is not getting credit for what it does is that many people are not aware of its activities.

Secretary Brown requested that all departments review the draft report, which distributed at the meeting. He reminded everyone that it is very important to make the public aware of all of the efforts by the government to implement the NII. Comments should be submitted to the Secretariat by August 13th.

Secretary Brown turned to Mr. Irving to report on the anniversary events being planned by the IITF Secretariat for September. Mr. Irving reported that in early September the White House Web Server will be unveiled. There will be a preview briefing for Congressional staffers. On September 7 and 8, the Committee on Applications and Technology and the Council on Competitiveness will co-sponsor the NII application conference. At the end of September, the NTIA will announce the NII grant program recipients. In late fall, the Universal Service Working Group will hold a "virtual" conference on universal service. In early October, the IITF hopes to release the Government Information Infrastructure: Agenda for Cooperation. In the fall, the IITF will formally launch the NII Public Awareness Campaign. Also, the NII Accomplishments Report will be released. On October, 1, at the White House there will be a "Kids Tech" event organized by KidsNet. Mr. Irving requested that the IITF Secretariat be kept apprised of other activities.

Mr. Nelson commented that when the NII Accomplishments Report is released the Congress will be making a final decision on appropriations. There are a number of key NII initiatives that are having trouble on the Hill. It is important to make sure that the reauthorization process goes well, and possibly the group should redouble efforts to support NIST, NOAA research, the National Technical Information Service, and other projects. Secretary Brown agreed and said Mr. Nelson had made a good point. He said it would not be beneficial to release this wonderful list of accomplishments, and then not have the success reflected in the budget priorities. It is very important not only that members of the Task Force communicate among themselves, but also that they communicate well with the outside world, especially people on the Hill.



## **NII CONSUMER ISSUES**

Secretary Brown introduced Polly Baca, Special Assistant to the President and Director of the U.S. Office of Consumer Affairs. Ms. Baca thanked the Secretary for inviting her to address the IITF, and said she was impressed with the sensitivity regarding consumer issues. She observed that some of the recurring issues include: (1) universal access and affordability, (2) the consumer's right to information and redress, (3) the consumer's right to education, (4) privacy or controlled personal data, and (5) security and fraud involving data.

Regarding the issue of universal service and affordability, the question is whether people can get on and stay on the system. Ms. Baca inquired whether there would be some way to determine if access is reliable. She noted that GTE and Pacific Bell had prepared a study about affordability. The report discovered that most people have access to basic telephone service, but 65% are not able to maintain service because of their high telephone bills. She is concerned about what happens to the system once people know how to access it. Ms. Baca also expressed concern about accident measures regarding the method of access.

With respect to consumers' rights to information and redress, and education of consumers, Ms. Baca stated that there is a need to develop a solid consumer education component. This should include the dissemination of consumer information and redress mechanisms to enable consumers to use the system with confidence and safety. Ms. Baca also proposed creating a policy about establishing university or community centers where people could access to the information highway.

Ms. Baca also inquired about the question of cost. She suggested coordinating policy and considering creative mechanisms to finance connections. One of her particular concerns is access for the disabled and language minorities -- people that do not have English as a primary language. She also raised the issue of privacy and control of personal data.

Ms. Baca informed the group that the conference in Paris for the Consumer Policy Committee of the OECD had considered the issue of methods for providing opportunities to redress. This issue should be considered both locally and internationally. There is a national hotline, which perhaps should be made available internationally.

In addition, Ms. Baca mentioned the issue of security in electronic transactions, particularly in the global marketplace.

Ms. Baca concluded her presentation by saying that her organization looks forward to addressing these issues, disseminating information, and working with the IITF.

## **DISCUSSION OF NII ADVISORY COUNCIL AND PUBLIC AWARENESS CAMPAIGN**

Secretary Brown reported that the IITF is working with the Advisory Council. Currently, there are thirty-seven members of the Council. Secretary Brown urged people to volunteer to work with the Mega-Projects, which include: (1) Vision and Goals; (2) Access; and (3) Privacy, Security, and Intellectual Property. The Mega-Project groups will be meeting throughout the summer and reporting to the full Advisory Council at its next meeting, scheduled for September 13, 1994.



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| Presidential Records Act - [44 U.S.C. 2204(a)]                                                                                     | Freedom of Information Act - [5 U.S.C. 552(b)]                                                                   |
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| PRM. Personal record misfile defined in accordance with 44 U.S.C. 2201(3).                                                         | b(9) Release would disclose geological or geophysical information concerning wells [(b)(9) of the FOIA]          |
| RR. Document will be reviewed upon request.                                                                                        |                                                                                                                  |



On the subject of public outreach, Secretary Brown noted that the federal agencies could be more successful in getting the word out about the work being done within government to build the NII. Public education efforts need to be increased. He has asked the Public Affairs department of the Department of Commerce to create a strategy and share the ideas broadly. The first step in the strategy will be an Administration-wide database of NII activities.

## ADJOURNMENT

Secretary Brown thanked the IITF members for their participation. He announced that the next IITF meeting will be held on October 4 and adjourned the meeting at 4:02 p.m.

## ATTENDEES:

Ronald H. Brown, Commerce  
Polly Baca, Office of Consumer Affairs  
James Baker, Commerce (NOAA)  
Lawrence Barrett, Small Business Administration  
Yvette Barrett, Commerce (NTIA)  
Herb Becker, Library of Congress  
Maya Bernstein, Office of Management & Budget  
Bob Bonometti, Office of Science & Technology Policy  
J. Boright, Office of Science & Technology Policy  
Susan Brummel, General Services Administration  
Mike Budjako, National Science Administration  
Mark Catlett, Veterans Affairs  
D. Cheney, Energy  
Bill Chou, Treasury  
Eliot Christian, U.S. Geological Survey  
John Clark, State  
Roger Cooper, Justice  
Gladys Cotter, NASA  
James Crinklaw, Office of Consumer Affairs  
(b)(3)  
Carol Darr, Commerce (OGC)  
Marilynn Davis, Housing & Urban Development  
(b)(3)  
Dan Demitros, Housing & Urban Development  
Steve Donahue, Labor  
Gayle Finch, Office of Management & Budget  
Jim Flyzik, Treasury  
Gordon Fullerton, FEMA  
Cita Furlani, Commerce (NIST)  
Patrick Garvey, Environmental Protection Agency  
Jock Gill, White House  
Adam Golodner, Agriculture (REA)  
Jim Gray, Tennessee Valley Authority

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Lee Holcomb, NASA  
 Michael Huerta, Transportation  
 Larry Irving, Commerce (NTIA)  
 Richard John, Transportation  
 Skip Johns, Office of Science & Technology Policy  
 Tom Kalil, National Economic Council  
 Sally Katzen, Office of Management & Budget (OIRA)  
 E.R. Kazenske, Commerce (PTO)  
 Debra Knopman, Interior  
 Frank Lalley, Veterans Affairs  
 Neal Lane, National Science Foundation  
 Kelly Levy, Commerce (NTIA)  
 Ellen Lovell, President's Committee on the Arts & the Humanities  
 David Lytel, Commerce (NIST)  
 Mark Mandell, Commerce  
 Vonya McCann, State  
 Bruce McConnell, Office of Management & Budget (OIRA)  
 Albert McGartland, Environmental Protection Agency  
 Denise Michel, Commerce  
 George Munoz, Treasury  
 Michelle Muth, Office of Consumer Affairs  
 Michael Nelson, Office of Science & Technology Policy  
 Emmit Paige, Jr., Defense  
 Robert Pepper, Federal Communications Commission  
 Al Pesachowitz, Environmental Protection Agency  
 Robert Portman, Labor  
 Arati Prabhakar, Commerce (NIST)  
 Anne Reed, Agriculture  
 Robert Reisner, Postal Service  
 Gary Ritter, Transportation  
 Kamie Roberts, Commerce (NIST)  
 Linda Roberts, Education  
 Bob Russell, Postal Service  
 Jonathan Sallet, Commerce  
 Elizabeth Schneirov, Council of Economic Advisers  
 Stephanie Schoumacher, Commerce (NTIA)  
 Jasmeet Seehra, Office of Management & Budget (OIRA)  
 Marc Shuster, Office of Science & Technology Policy  
 Laura Sigal, Commerce (NTIA)  
 John S. Silva, Defense (ARPA)  
 Nate Sleeper, Council of Economic Advisers  
 Gwen Solomon, Education  
 Merrill Spiegel, Federal Communications Commission  
 (b)(3)  
 Neil J. Stillman, Health & Human Services  
 David Turetsky, Justice  
 Kent Walker, Justice  
 Tatia Williams, Commerce (NTIA)  
 Paul Young, National Science Foundation





UNITED STATES DEPARTMENT OF COMMERCE  
National Telecommunications and  
Information Administration  
Washington, D.C. 20230

*Cop 6*  
*Baker*

MEMORANDUM

DATE: August 16, 1994  
TO: Agency/Department IITF Representatives  
FROM: IITF Secretariat  
SUBJECT: NII Glossary

Attached is a draft glossary of NII-related terms taken primarily from the Proposed Federal Standard 1037B, "Telecommunications: Glossary of Telecommunication Terms," published by the General Services Administration's Office of Information Resources Management. Please review the glossary and provide me with your comments and/or edits by C.O.B. August 31, 1994. Our goal is to distribute the glossary during September and at the next IITF meeting (scheduled for October 4).

If you have any questions, please contact Charles Franz at 202/482-1835.



- access charge** A surcharge levied per the *Code of Federal Regulations*, Title 47, part 69, on each line or circuit that has the ability to access or be accessed by a public exchange network.
- access line** The circuit that connects the user location with a switching center. Communications circuit that connects a customer location to a switching center.
- address** 1. In communications, the coded representation of the source or destination of a message. (188) 2. In data processing, a character or group of characters that identifies a register, a particular part of storage, or some other data source or destination. 3. To assign to a device or item of data a label to identify its location. (188) 4. The part of a selection signal that indicates the destination of a call. 5. To refer to a device or data item by its address.
- advanced television (ATV)** A family of television systems that are improvements over distribution-quality television. The family includes extended-definition television (EDTV), high-definition television (HDTV), and improved definition television (IDTV).
- amplitude modulation (AM)** A form of modulation in which the amplitude of a carrier wave is varied in accordance with some characteristic of the modulating signal. *Note:* Amplitude modulation implies the modulation of a coherent carrier wave by mixing it in a nonlinear device with the modulating signal, to produce discrete upper and lower sidebands, which are the sum and difference frequencies of the carrier and signal. The envelope of the resultant modulated wave is an analog of the modulating signal. The instantaneous value of the resultant modulated wave is the vector sum of the corresponding instantaneous values of the carrier wave, upper sideband, and lower sideband. Recovery of the modulating signal may be by direct detection or by heterodyning.
- analog computer** A device that performs operations on data that are represented, within the device, by continuous variables having some physical resemblance to the quantities being represented. *Note:* The earliest analog computers were purely mechanical devices with levers, cogs, cams, etc., representing the data or operator values. Modern analog computers typically employ electrical parameters such as voltage, resistance, or current to represent the quantities being manipulated.
- analog data** Data represented by a physical quantity that is considered to be continuously variable and whose magnitude is made directly proportional to the data or to a suitable function of the data.
- analog signal** 1. A signal that makes use of electrical or physical analogies; i.e., varying voltages, frequencies, distances, etc., to produce a signal of a continuous (rather than of a pulsed or discrete) nature. 2. A nominally continuous electrical signal that varies in some direct correlation to another signal impressed on a transducer. *Note:* The electrical signal may vary its frequency, phase, or amplitude, for instance, in response to changes in phenomena or characteristics such as sound, light, heat, position, or pressure.
- antenna** Any structure or device used to collect or radiate electromagnetic waves.
- Archie** An Internet program that allows for searches of files available by anonymous File Transfer Protocol (FTP).
- artificial intelligence (AI)** The capability of a device to perform functions that are normally associated with human intelligence such as reasoning, learning, and self-improvement. *Note:* AI is the branch of computer science that attempts to approximate the results of human reasoning by organizing and manipulating factual and heuristic knowledge. Areas of AI activity include expert systems, natural language understanding, speech recognition, vision, and robotics.
- ASCII** *Acronym for American Standard Code for Information Interchange.* The standard code, using a coded character set consisting of 7-bit coded characters (8 bits including parity check), used for information interchange among data processing systems, data communications systems and associated equipment. *Note:*



The ASCII set consists of control characters and graphic characters, and is properly an alphabet and not a code. It is the U.S. implementation of International Alphabet No. 5 (IA No. 5) as specified in CCITT Recommendation V.3.

**asynchronous communication system** A data communication system that employs asynchronous operation, such as a data communication system in which extra signal elements are appended to the data for the purpose of synchronizing individual data characters or blocks. *Note:* The time spacing between successive data characters or blocks may be of arbitrary duration.

**authorized frequency** A frequency that is allocated and assigned by a competent authority to a specific user for a specific purpose.

**band** 1. In communications, the frequency spectrum between two defined limits. 2. A group of tracks on a magnetic drum or on one side of a magnetic disk. 3. A designator used by common carriers to define geographical areas.

**bar code** A code representing characters by sets of parallel bars of varying thickness and separation that are read optically by transverse scanning.

**basic rate interface (BRI)** A CCITT Integrated Services Digital Network (ISDN) multipurpose user's interface standard that denotes the capability of simultaneous voice and data services provided over two clear 64-kbps channels and one clear 16-kbps channel (2B+D) access arrangement to each subscriber's location.

**basic service** 1. A pure transmission capability over a communication path that is virtually transparent in terms of its interaction with customer-supplied information. 2. The offering of transmission capacity between two or more points suitable for a user's transmission needs and subject only to the technical parameters of fidelity and distortion criteria, or other conditioning.

**basic serving arrangement (BSA)** 1. The fundamental tariffed switching and transmission (and other) services that an operating company must provide to an enhanced service provider (ESP) to connect with its customers through the company network.

**baud (Bd)** 1. A unit of modulation rate. One baud corresponds to a rate of one unit interval per second, where the modulation rate is expressed as the reciprocal of the duration in seconds of the shortest unit interval.

**Bell Operating Company (BOC)** Any of the 22 operating companies that were divested from the AT&T company by court order. *Note:* Cincinnati Bell Telephone Co. and Southern New England Bell Telephone Co. are not included.

**binary digit (bit)** 1. A character used to represent one of the two digits in the numeration system with a base of two, each digit representing one of two, and only two, possible states of a physical entity or system. 2. In binary notation either of the characters 0 or 1.

**bit** Acronym for binary digit.

**broadband ISDN (B-ISDN)** A CCITT proposed Integrated Services Digital Network offering broadband capabilities including many of the following features or services: (a) from 150 to 600 Mbps interfaces, (b) using ATM (asynchronous transfer mode) to carry all services over a single, integrated, high-speed packet-switched net, (c) LAN interconnection, (d) the ability to connect LANs at different locations, (e) access to a remote, shared disk server, (f) voice/video/data teleconferencing from one's desk, (g) transport for programming services (e.g., cable TV), (h) single-user controlled access to remote video source, (i) voice/video telephone calls, and j) access to shop-at-home and other information services. *Note:* Techniques involved in the B-ISDN include code conversion, information compression, multipoint connections, multiple-connection calls. Current proposals use



service-independent call structure that allows flexible arrangement and modular control of access and transport edges, the service components of a connection which can provide each user in a connection with independent control of its access features and serve as the basis of a simplified control structure for multipoint and multiconnection calls. Such a network might be expected to offer a variety of ancillary information processing functions.

**broadcasting-satellite service** A radiocommunication service in which signals transmitted or retransmitted by space stations are intended for direct reception by the general public. In the broadcasting-satellite service, the term "*direct reception*" shall encompass both individual reception and community reception.

**broadcasting service** A radiocommunication service in which the transmissions are intended for direct reception by the general public. This service may include sound transmissions, television transmissions or other types of transmissions.

**bypass** 1. *Broadly*, the use of any telecommunication facilities or services in circumvention of the local exchange carrier. *Note:* The alternative facilities or services may be either customer-provided or vendor-supplied. 2. *Generally*, an alternate circuit around some user equipment, group of equipments, or system element. *Note:* Usually provided to allow system operation to continue when the bypassed portion is inoperable.

**byte** A sequence of N adjacent binary digits, usually treated as a unit, where N is a nonzero integral number. *Note:* In pre-1970 literature, "*byte*" referred to a variable-length field. Since that time the usage has changed so that now it almost always refers to an 8-bit field. This usage predominates in computer and data transmission literature; when so used, the term is synonymous with "*octet*."

**cable** 1. An assembly of one or more conductors or optical fibers, or a combination of both, within an enveloping sheath. 2. A message sent by cable, or by extension, any means of telegraphy.

**cell** 1. In cellular radio, the smallest geographic area defined for certain mobile communication systems. *Note:* Each cell has its own base station and a single controller interconnected with the public telephone network. 2. In OSI, a fixed-length block labeled at the Physical Layer of the Open Systems Interconnection Reference Model. 3. In computer systems, an addressable, internal hardware location. 4. In computer systems, a single location on a spreadsheet.

**cellular radio** A mobile communication system based on a blend of radio transmission and telephone switching, which system permits telephone communication to and from mobile users within a defined area. *Note:* Large geographical areas are segmented into many smaller "cells," each of which has its own base station and a single controller interconnected with the public switched telephone network. The same frequencies are reused in noncontiguous cells since power output and signal direction are carefully controlled.

**channel** 1. A connection between initiating and terminating nodes of a circuit. 2. A single path provided from a transmission medium either by physical separation, e.g., multipair cable, or by electrical separation, e.g., frequency- or time-division multiplexing. 3. A single unidirectional or bidirectional path for transmitting or receiving, or both, of electrical or electromagnetic signals, usually in distinction from other parallel paths.

**cipher** Any cryptographic system in which arbitrary symbols or groups of symbols, represent units of plain text of regular length, usually single letters, or in which units of plain text are rearranged, or both, in accordance with certain predetermined rules.

**circuit** 1. The complete path between two terminals over which one-way or two-way communications may be provided. 2. An electronic path between two or more points, capable of providing a number of channels. 3. A number of conductors connected together for the purpose of carrying an electrical current. 4. An electronic closed-loop path among two or more points used for signal transfer.



**client** A software application that allows the user to access a service from a server computer on the Internet.

**coaxial cable (coax)** A cable consisting of a center conductor surrounded by an insulating material and a concentric outer conductor. *Note:* Used primarily for wideband, video, or radio frequency service.

**code** 1. A set of unambiguous rules specifying the manner in which data may be represented in a discrete form. *Note:* In the broadest sense, coding is a means of converting information into a form suitable for communications, processing, or encryption. 2. Any system of communication in which arbitrary groups of symbols represent units of plain text of varying length. Codes may be used for brevity or for security.

**common carrier** 1. An organization that provides telecommunication facilities, services, or classes of service to the public for hire. 2. Any person engaged as a common carrier for hire, in interstate or foreign communication by wire or radio or in interstate or foreign radio transmission of energy, except where reference is made to common carriers not subject to [this Act]; but a person engaged in radio broadcasting shall not, insofar as such person is so engaged, be deemed a common carrier. *Note:* "Person" means an individual, a corporation, a partnership, an association, a joint-stock company, a business trust, or any other organized group, or any receiver or trustee. (CFR 47)

**common-channel signaling** In a multichannel network, a signaling method using a separate channel for the control, accounting, and management of traffic. *Note:* The same channels that are used for signaling (frequency bands or time slots) are not used for message traffic.

**communications** 1. A method or means of conveying information of any kind from one person or place to another. 2. A method or means of conveying information of any kind from one person or process to other person(s) or process(es) by a telecommunication medium.

**communications satellite** An orbiting vehicle that relays signals between communications stations. There are two types: (a) active communications satellite--a satellite that receives, regenerates, and retransmits signals between stations; and (b) passive communications satellite--a satellite that reflects communications signals between stations.

**communications system** A collection of individual communication networks, transmission systems, relay stations, tributary stations, and terminal equipment capable of interconnection and interoperation to form an integral whole. *Note:* These individual components must serve a common purpose, be technically compatible, employ common procedures, respond to some form of control, and, in general, operate in unison.

**community antenna television (CATV)** A television distribution method whereby signals from distant stations are received, amplified, and then transmitted by (coaxial or fiber) cable or microwave links to subscribers. *Note 1:* In most countries CATV originated in areas where good reception of direct broadcast TV was not possible. Now CATV also provides a highly sophisticated cable distribution system to large metropolitan areas in direct and successful competition with direct broadcasting. *Note 2:* The abbreviation "CATV" originally applied to this technology. However, "CATV" is now typically used to mean "cable TV".

**community of interest** A grouping of users who generate a majority of their traffic in calls to each other. It may be related to a geographic area or to an administrative organization.

**compression** A process in which the dynamic range of a signal is reduced by controlling it as a function of the inverse relationship of its instantaneous value relative to a specified reference level. *Note 1:* Input levels that are low relative to the reference level thus realize a relative increase, and levels that are high relative to the reference level thus realize a relative decrease. *Note 2:* Compression is usually accomplished by separate devices called compressors and is used for many purposes, such as: improving signal-to-noise ratios, preventing overload of succeeding elements of a system, or matching the dynamic ranges of two devices. *Note 3:* The amount of compression (expressed in decibels) may be a linear or nonlinear function of the signal level across the frequency band of interest and may be essentially instantaneous or have fixed or variable delay times. *Note 4:*



Compression always introduces distortion, which is usually not objectionable, provided the compression is limited to a few decibels.

**computer** 1. A device capable of accepting and processing information and supplying the results. It usually consists of input, output, storage, arithmetic, logic, and control units. 2. A functional unit that can perform substantial computation, including numerous arithmetic operations or logic operations, without intervention by a human operator during a run.

**computer conferencing** 1. The ability for multiple users/groups to access a common information base mediated by a controlling computer. 2. The interconnection of two or more computers working in a distributed manner on a common application process.

**computer system** A functional unit, consisting of one or more computers and associated software, that uses common storage for all or part of a program and also for all or part of the data necessary for the execution of the program; executes user-written or user-designated programs; performs user-designated data manipulation, including arithmetic operations and logic operations; and that may execute programs that modify themselves during their execution. *Note:* A computer system may be a stand-alone unit or may consist of several interconnected units.

**database** A set of data that is required for a specific purpose or is fundamental to a system, project, enterprise, or business. *Note:* A database may consist of one or more data banks and be geographically distributed among several repositories.

**database management system (DBMS)** 1. A computer-based system used to establish, make available, and maintain the integrity of a database. 2. An integrated set of computer programs that collectively provide all of the capabilities required for centralized management, organization, and control of access to a database that is shared by many users.

**data circuit** A pair of associated transmit and receive channels that provides a means of two-way data communication.

**data circuit-terminating equipment (DCE)** In a data station, the equipment that provides signal conversion, coding, and other functions at the network end of the line between the data terminal equipment and the line, and that may be a separate or an integral part of the data terminal equipment or of the intermediate equipment.

**data compression** 1. The process of reducing (a) bandwidth, (b) cost, and (c) time for the generation, transmission, and storage of data by employing techniques designed to remove data redundancy. 2. The use of techniques such as null suppression, bit mapping, and pattern substitution for purposes of reducing the amount of space required for storage of textual files and data records. *Note:* Some data compaction methods employ fixed tolerance bands, variable tolerance bands, slope-keypoints, sample changes, curve patterns, curve fitting, floating-point coding, variable precision coding, frequency analysis, and probability analysis. (Simply squeezing noncompacted data into a smaller space, e.g., by transferring data on punched cards onto magnetic tape, is not considered data compression.)

**Data Encryption Standard (DES)** A cryptographic algorithm for the protection of unclassified computer data, issued as Federal Information Processing Standard Publication (FIPS PUB) 46-1. *Note:* The DES, which was promulgated by the National Institute of Standards and Technology (NIST)--formerly the National Bureau of Standards (NBS)--is intended for public and Government use.

**decode** 1. To convert data by reversing the effect of some previous encoding. 2. To interpret a code. 3. To convert encoded text into its equivalent plain text by means of a code. *Note:* This does not include solution by cryptanalysis.

**decrypt** To convert encrypted text into its equivalent plain text by means of a cryptosystem. (This does not include



solution by cryptanalysis.) *Note:* The term decrypt covers the meanings of decipher and decode.

**dedicated circuit** A circuit designated for exclusive use by specified users.

**demarcation point (demarc)** That point at which operational control or ownership changes from one organizational entity to another.

**demodulation** The process wherein a signal resulting from previous modulation is processed to derive a signal having substantially the characteristics of the original modulating signal.

**deregulation** The reduction in tariff, market entry and exit, and facilities regulation of public telecommunication services.

**dial-up** 1. A switching system service feature that allows a user to initiate service on a previously arranged trunk or to transfer from an active trunk to a standby trunk without operator intervention. 2. The service by which a computer terminal can use telephone systems to initiate and effect communications with a computer.

**digital switch** Switching equipment designed, designated, or used to perform time-division multiplexed switching of digital signals. *Note 1:* When used with analog inputs, an A-D/D-A conversion is required. *Note 2:* Normal implementation is by interchanging time slots between input and output ports on a regular sequential basis under the direction of control systems. The control systems may be automatic, semiautomatic, or manual.

**digitize** To convert an analog signal to a digital signal carrying equivalent information.

**direct distance dialing (DDD)** In the public telephone network, a service feature whereby a user may, without assistance from any network operating personnel, call any other user connected to the network outside the originator's local calling area. *Note 1:* This method extends beyond the boundaries of the national public telephone network. *Note 2:* The method requires additional digits in the number dialed, over those required for use within the local area.

**direct inward dialing (DID)** 1. A service feature that allows inward-directed calls to a PBX to reach a specific PBX station without attendant assistance. 2. In a switching system, a service feature that permits incoming trunk calls to be forwarded directly to a user without attendant intervention.

**direct outward dialing (DOD)** 1. In a switching system, a service that allows outward calls from a PBX terminal without attendant assistance. 2. In a switching system, a service feature that permits outgoing trunk calls to be dialed directly without attendant assistance.

**downlink** That portion of a communication link used for transmission of signals from a satellite or airborne platform to a surface terminal. It is the converse of uplink.

**Earth coverage (EC)** In satellite communications, the condition obtained when a beam is sufficiently wide to cover the surface of the Earth exposed to the satellite.

**Earth station** A station located either on the Earth's surface or within the major portion of the Earth's atmosphere and intended for communication:

--with one or more space stations; or

--with one or more stations of the same kind by means of one or more reflecting satellites or other objects in space.

**electronic mail** An electronic means for communicating information (primarily text) by a method of sending, storing, processing, and retrieving the information. This allows users to communicate under specified conditions. *Note:* Messages are held in storage until called for by the addressee.



**emission** 1. Electromagnetic energy propagated from a source by radiation or conduction. *Note:* The energy thus propagated may be either desired or undesired and may occur anywhere in the electromagnetic spectrum. 2. Radiation produced, or the production of radiation, by a radio transmitting station. For example, the energy radiated by the local oscillator of a radio receiver would not be an emission but a radiation.

**end user** The ultimate consumer of a telecommunication service.

**enhanced service** Service, offered over commercial carrier transmission facilities used in interstate communications, that employs computer processing applications that act on the format, content, code, protocol, or similar aspects of the subscriber's transmitted information; provides the subscriber with additional, different, or restructured information; or involves subscriber interaction with stored information.

**exchange** A room or building equipped so that telephone lines terminating there may be interconnected as required. *Note:* The equipment may include manual or automatic switching equipment.

**exchange access** In the telephone networks, the provision of exchange services for the purpose of originating or terminating interexchange telecommunications. *Note:* Such services are provided by facilities in an exchange area for the transmission, switching, or routing of interexchange telecommunications originating or terminating within the exchange area.

**facsimile (FAX)** 1. A form of telegraphy for the transmission of fixed images, with or without half-tones, with a view to their reproduction in a permanent form. In this definition the term telegraphy has the same general meaning as defined in the Convention. 2. A system of telecommunication for the transmission of fixed images with a view to their reception in a permanent form. 3. The process, or the result of the process, by which fixed graphic material, including pictures or images, is scanned and the information converted into electrical signals that may be transmitted over a telecommunication system and used to record a copy of the original.

**FAQ: Frequently Asked Question(s)** A document containing questions (and answers) often asked by users about a particular subject. Many groups compile FAQ files to avoid constant repetition of the same questions.

**fault** 1. A defect that causes a reproducible or catastrophic malfunction. *Note:* A malfunction is considered reproducible if it occurs consistently under the same circumstances. 2. In power systems, an unintentional short-circuit, or partial short-circuit, between energized conductors or between an energized conductor and ground. 3. An accidental condition that causes a functional unit to fail to perform its required function.

**Federal Telecommunications System (FTS)** A switched telecommunication network designed to provide analog and digital transmission for the Federal Government within and among the 50 states and Trust Territories of the United States.

**fiber optics (FO)** The branch of optical technology concerned with the transmission of radiant power through fibers made of transparent materials such as glass (including fused silica) or plastic. *Note 1:* Telecommunications applications of fiber optics employ flexible low-loss fibers, using a single fiber per information channel(s). *Note 2:* Various industrial and medical applications employ (typically high-loss) flexible fiber bundles in which individual fibers are spatially aligned, permitting optical relay of an image, such as in an endoscope. *Note 3:* Some specialized industrial applications employ rigid (fused) aligned fiber bundles for image transfer, such as in the fiber optics faceplate used on some high-speed oscilloscopes.

**fixed-satellite service** A radiocommunication service between Earth stations as specified fixed points when one or more satellites are used; in some cases this service includes satellite-to-satellite links, which may also be effected in the inter-satellite service, the fixed-satellite service may also include feeder links for other space radiocommunication services.

**footprint** In satellite communications, that portion of the Earth's surface over which a satellite antenna delivers a



specified amount of signal power under specified conditions. *Note:* The limiting case is somewhat less than one half the Earth's surface and depends on the altitude of the satellite.

**foreign exchange (FX) service** A service in which a telephone in a given local exchange area, instead of being connected directly to the central office serving that exchange area, is connected, via a private line, to a central office in another (in telephone parlance, "*foreign*") exchange area. *Note:* To callers, it appears that the FX telephone is actually located in the caller's local exchange. *Synonym* long call.

**frequency assignment** The process of authorizing a specific frequency, group of frequencies, or frequency band to be used at a certain location under specified conditions such as bandwidth, power, azimuth, duty cycle, or modulation.

**frequency modulation (FM)** The form of angle modulation in which the instantaneous frequency of a sine wave carrier is caused to depart from the carrier frequency by an amount proportional to the instantaneous value of the modulating signal.

**FTP: File Transfer Protocol** A protocol that allows computers on the Internet to exchange files, regardless of the computer platform.

**gateway** In a communication network, one of the network nodes equipped for interfacing with a network using different protocols. *Note:* It may contain devices such as protocol translators, impedance matching devices, rate converters, fault isolation, or signal translators as necessary to provide system interoperability. It also requires that mutually acceptable administrative procedures be established between the two networks.

**geostationary orbit** An orbit that is circular, lies in the plane of the equator, and on which any point revolves about the Earth's polar axis in the same direction and with the same period as the Earth's rotation. *Note:* An object in a geostationary orbit will remain above a fixed point on the Earth's equator at a distance of approximately 42,164 km from the center of the Earth.

**geostationary satellite** A geosynchronous satellite whose circular and direct orbit lies in the plane of the Earth's equator and which thus remains fixed relative to the Earth; by extension, a satellite that remains approximately fixed relative to the Earth.

**gigahertz (GHz)** A unit of frequency denoting  $10^9$  hertz.

**gopher** An Internet user interface that allows searches of databases by menus and provides links to other databases.

**Government Open Systems Interconnection Profile (GOSIP)** A definition of Federal Government functional requirements for open systems computer network products. A common set of Open System Interconnection (OSI) data communication protocols that enables systems developed by different vendors to interoperate and enable the users of different applications on these systems to exchange information. *Note 1:* These OSI protocols were developed primarily by ISO and CCITT. *Note 2:* The GOSIP is a subset of the OSI protocols and is based on agreements reached by vendors and users of computer networks participating in the National Institute of Standards and Technology (NIST) Implementors Workshop. *Note 3:* The GOSIP is promulgated as FIPS Pub 146.

**handoff** 1. In a cellular radio system, the process of transferring a phone call in progress from one cell transmitter and frequency to another cell transmitter using a different frequency without interruption of the call. 2. In satellite communications, the process of transferring ground station to another without loss or interruption of service.

**handshaking** 1. In data communication, a sequence of events governed by hardware or software, requiring mutual agreement of the state of the operational modes prior to change. 2. The process used to establish



communications parameters between two stations.

**hard copy** In computer graphics or telecommunications, a permanent reproduction of the data displayed or transmitted. The reproduction may be on any media suitable for direct use by a person. *Note 1:* Teletypewriter pages, continuous printed tapes, facsimile pages, computer printouts, and radiophoto prints are all examples of hard copy. *Note 2:* Magnetic tapes or diskettes or nonprinted punched paper tapes are not hard copy.

**high-definition television (HDTV)** Television that has approximately twice the horizontal and twice the vertical emitted resolution specified by the NTSC standard. HDTV employs a wide aspect ratio. *Note 1:* The total number of pixels is therefore more than four times that of NTSC. *Note 2:* HDTV may include any or all IDTV and EDTV improvements.

**host computer** In a computer network, a computer that provides end users with services such as computation and database access and that usually performs network control functions. *Synonym* host.

**hybrid** 1. A device, circuit, apparatus, or system made up of two or more subassemblies, often employing different technologies, not heretofore combined, to satisfy a given requirement. *Note:* Examples include: (a) an electronic circuit having both vacuum tubes and transistors; (b) a mixture of thin-film and discrete integrated circuits; (c) a computer that has both analog and digital capability. 2. A transformer or combination of transformers, or resistive network affording paths to three branches, circuits A, B, and C, so arranged that A can send to C, B can receive from C, but A and B are effectively isolated.

**Hz** *Abbreviation for hertz.*

**Integrated Services Digital Network (ISDN)** An integrated digital network in which the same time-division switches and digital transmission paths are used to establish connections for different services. *Note 1:* Such services include telephone, data, electronic mail, and facsimile. *Note 2:* How a connection is accomplished is often specified. For example, switched connection, nonswitched connection, exchange connection, ISDN connection.

**intelligent network (IN)** A network that allows functionality to be distributed flexibly at a variety of nodes on and off the network and allows the architecture to be modified to control the services; [in North America] an advanced network concept that is envisioned to offer such things as (a) distributed call-processing capabilities across multiple network modules, (b) real-time authorization code verification, (c) one-number services, and (d) flexible private network services [including (1) reconfiguration by subscriber, (2) traffic analyses, (3) service restrictions, (4) routing control, and (5) data on call histories].

**interconnection** The linking together of interoperable systems.

**interexchange carrier (IXC)** Any service provider offering inter-LATA telecommunications services.

**interface (I/F)** 1. A concept involving the definition of the interconnection between two equipment items or systems. The definition includes the type, quantity, and function of the interconnecting circuits and the type, form, and content of signals to be interchanged via those circuits. Mechanical details of plugs, sockets, and pin numbers, etc., may be included within the context of the definition. 2. A shared boundary, e.g., the boundary between two subsystems or two devices.

**Internet** The Internet is the catch-all word used to describe a massive world-wide network of computers. The word "internet" literally means "network of networks". In 1969, the Advanced Research Projects Agency of the Department of Defense contracted for establishment of the ARPANET to help researchers communicate. The Internet, as it came to be known, is comprised of high capacity circuits linking thousands of smaller regional networks scattered throughout the globe. On any given day it connects roughly 15 million users in over 50 countries and continues to grow rapidly.



**internetworking** The process of interconnection of a number of individual networks to provide a path from one network to another network. *Note:* The networks involved may be of the same type, or they may be of different types; the important thing is that each network is distinct, with its own addresses, internal protocols, access methods, and administration.

**interoperability** 1. The ability of systems, units, or forces to provide services to and accept services from other systems, units, or forces and to use the services so exchanged to enable them to operate effectively together.  
2. The condition achieved among communications-electronics systems or items of communications-electronics equipment when information or services can be exchanged directly and satisfactorily between them and/or their users. The degree of interoperability should be defined when referring to specific cases.

**IP: Internet Protocol** The system of data transfer between computers that forms the foundation for the Internet network.

**key telephone system (KTS)** Terminals and equipment in a local environment providing immediate access from all terminals to a variety of telephone services without attendant assistance. *Note:* It may or may not interface with the public switched telephone network.

**land mobile station** A mobile station in the land mobile service capable of surface movement within the geographical limits of a country or continent.

**laser** *Acronym for light amplification by stimulated emission of radiation.* A device that produces an intense, coherent, directional beam of optical radiation by stimulating electronic, ionic, or molecular transitions to higher energy levels so that when they return to lower energy levels they emit energy. *Note:* Laser radiation may be highly coherent temporally, or spatially, or both.

**local access and transport area (LATA)** Under the terms of the Modification of Final Judgment the geographical area within which a Bell Operating Company is permitted to provide exchange telecommunications and exchange access services after divestiture by AT&T.

**local area network (LAN)** A nonpublic data communication system, within a limited geographical area, designed to allow a number of independent devices to communicate with each other over a common transmission-interconnection topology. *Note 1:* LANs are usually restricted to relatively small geographical areas, e.g., rooms, buildings, or clusters of buildings, and use fairly high data rates. *Note 2:* A LAN is not subject to public telecommunications regulations.

**management information system (MIS)** An organized assembly of resources and procedures required to collect, process, and distribute data for use in decision making.

**measured-rate service** Telephone service for which charges are made in accordance with the use made of the line.

**megahertz (MHz)** A unit of frequency denoting one million ( $10^6$ ) Hz.

**message service** Switched service furnished to the general public (as distinguished from private line service). Except as otherwise provided, this includes exchange switched services and all switched services provided by interexchange carriers and completed by a local telephone company's access services. . . .

**message unit** A unit of measure for charging telephone calls, based on parameters such as the length of the call, the distance called, and/or the time of day.

**metropolitan area network (MAN)** A loosely defined term generally understood to describe a network covering an



area larger than a local area network. *Note:* It typically interconnects two or more local area networks, may operate at a higher speed, may cross administrative boundaries, and may use multiple access methods.

**microcomputer** A computer system whose processing unit is a micro-processor. A basic micro-computer includes a micro-processor, storage, and an input/output facility which may or may not be on one chip.

**microprocessor** A central processing unit implemented on a single chip.

**microwave (mw)** A term loosely applied to those radio frequency wavelengths that are sufficiently short to exhibit some of the properties of light, e.g., they are easily concentrated into a beam. Commonly used for frequencies from about 1 GHz to 30 GHz.

**mobile-satellite service** A radiocommunication service:

--between mobile Earth stations and one or more space stations, or between space stations used by this service;  
or

--between mobile Earth stations by means of one or more space stations.

This service may also include feeder links necessary for its operation.

**mobile service** A radiocommunication service between mobile and land stations, or between mobile stations.

**modem** *Acronym for modulator-demodulator.* A device that modulates and demodulates signals. *Note 1:* Modems are primarily used for converting digital signals into quasi-analog signals for transmission over analog communication channels and for reconvertng the quasi-analog signals into digital signals. *Note 2:* Many additional functions may be added to a modem to provide for customer service and control features. *Synonym signal conversion equipment.*

**Modification of Final Judgment (MFJ)** The 1982 antitrust suit settlement agreement ("*Consent Decree*") entered into by the United States Department of Justice and the American Telephone and Telegraph Company (AT&T) that, after modification and upon approval of the United States District Court for the District of Columbia, required the divestiture of the Bell Operating Companies from AT&T.

**modulation** A controlled variation of any property of a wave for the purpose of transferring information.

**monitor** 1. Software or hardware that scrutinizes and then displays, records, supervises, controls, or verifies the operations of a system. *Note:* Possible uses of monitors are to indicate significant departures from the norm, or to determine levels of utilization of particular functional units. 2. *Synonym visual display unit.*

**Mosaic** A World-Wide Web (WWW) browser or client developed by the National Center for Supercomputing Applications. Mosaic is capable of accessing data via protocols such as Gopher, World Wide Web, FTP and NNTP (Usenet News) natively, and other data services such as Archie, WAIS, and Veronica through gateways. NCSA Mosaic was designed to provide its user transparent and seamless access to these information sources and services. Mosaic is a product that will retrieve and display a wide variety of data types. These types include text, images, movies and audio.

**mouse** A hand-held computer input device that generates the coordinates of a position indicator and is operated by being moved on a flat surface.

**multiple access** 1. The connection of a user or subscriber end-instrument to two or more switching centers by separate access lines using a single-message routing indicator or telephone number. 2. In satellite communications, the capability of a communication satellite to function as a portion of a communication link between more than one pair of satellite terminals simultaneously. *Note:* Three types of multiple access are presently employed with communication satellites: code-division, frequency-division, and time-division.

**multiplexer (MUX)** A device for the combining of two or more channels.



**National Information Infrastructure (NII)** The National Information Infrastructure will consist of:

- (1) thousands of interconnected, interoperable telecommunications networks,
- (2) computer systems, televisions, fax machines, telephones, and other "information appliances",
- (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, for an affordable price.

**network** 1. An interconnection of three or more communicating entities and (usually) one or more nodes. 2. A combination of passive or active electronic components that serves a given purpose.

**network architecture** 1. The design principles, physical configuration, functional organization, operational procedures, and data formats used as the basis for the design, construction, modification, and operation of a communications network. 2. The structure of an existing communication network including the facilities, operational structure and procedures, and the data formats.

**network interface** 1. The point of interconnection between a user terminal and a private or public network. 2. The point of interconnection between the public switched network and a privately owned terminal. *Note: Code of Federal Regulations, Title 47, part 68, stipulates the interface parameters.* 3. The point of interconnection between one network and another network (or portion thereof).

**node** 1. In network topology, a terminal of any branch of a network or an interconnection common to two or more branches of a network. 2. In a switched network, one of the switches forming the network backbone. 3. A technical control facility (TCF). 4. A point in a standing or stationary wave at which the amplitude is a minimum.

**on-line** That condition wherein devices or subsystems are connected into, form a part of, and are subject to the same controls as an operational system.

**open network architecture (ONA)** In the context of the Federal Communications Commission's Computer Inquiry III, the overall design of a communication carrier's basic network facilities and services to permit all users of the basic network to interconnect to specific basic network functions and interfaces on an unbundled, equal-access basis. *Note: The ONA concept consists of three integral components: (a) basic serving arrangements (BSAs), (b) basic service elements (BSEs), and (c) complementary network services.*

**open system** A system whose characteristics comply with specified, publicly maintained, readily available standards and that therefore can be connected to other systems that comply with these same standards. (After FP) (After ISO)

**Open Systems Interconnection (OSI)** A logical structure for network operations standardized within the ISO; a seven-layer network architecture being used for the definition of network protocol standards to enable any OSI-compliant computer or device to communicate with any other OSI-compliant computer or device for a meaningful exchange of information.

**optical fiber** Any filament or fiber, made of dielectric materials, that guides light, whether or not it is used to transmit signals.

**orbit** The path, relative to a specified frame of reference, described by the center of mass of a satellite or other object in space subjected primarily to natural forces, mainly the force of gravity.



- other common carrier (OCC)** A specialized common carrier, domestic and/or international record carrier, or domestic satellite carrier engaged in providing services authorized by the Federal Communications Commission.
- packet** In data communication, a sequence of binary digits, including data and control signals, that is transmitted and switched as a composite whole. The data, control signals, and possibly error control information, are arranged in a specific format.
- packet switching** The process of routing and transferring data by means of addressed packets so that a channel is occupied during the transmission of the packet only, and upon completion of the transmission the channel is made available for the transfer of other traffic.
- PBX** *Abbreviation for private branch exchange.* 1. A private telecommunication exchange that usually includes access to the public switched network. 2. A switch serving a selected group of users and subordinate to a higher level military establishment switch.
- primary rate interface (PRI)** An ISDN network interface standard (designated in North America) with a network channelization of 23B+D. All circuit-switched B channels operate at 64 kbps; the D channel operates at 64 kbps. This combination results in a DS1 (T1) interface at the network boundary.
- privacy** 1. The protection afforded to information transmitted in a communications system or network to conceal it from persons within the system or network. *Synonym segregation.* 2. Short-term protection afforded those unclassified communications that require safeguarding, within existing laws, from unauthorized persons; e.g., radio communications of law enforcement personnel. 3. The protection afforded by a communication system against unauthorized disclosure of the information in the system. *Note:* The required protection may be accomplished by communication security measures, by directives to operating personnel, or other means. The limited protection afforded certain voice and data transmissions by various commercial crypto-equipment is sufficient to deter a casual listener, but could not withstand a technically competent cryptanalytic attack.
- program** 1. A plan or routine for solving a problem on a computer. 2. A sequence of instructions used by a computer to do a particular job or solve a given problem. 3. To design, write, and test programs.
- protocol** 1. [In general,] A set of semantic and syntactic rules that determines the behavior of functional units in achieving communication. *Note:* Protocols may govern portions of a network, types of service, or administrative procedures. For example, a data link protocol is the specification of methods whereby data communication over a data link is performed in terms of the particular transmission mode, control procedures, and recovery procedures. 2. In layered 2communication system architecture, a formal set of procedures that are adopted to facilitate functional interoperation within the layered hierarchy.
- public switched telephone network (PSTN)** The domestic telecommunications network commonly accessed by ordinary telephones, key telephone systems, private branch exchange trunks, and data arrangements. *Note:* Completion of the circuit between the calling and called parties in this network requires network signaling in the form of dial pulses or multifrequency signals.
- public utility commission (PUC)** A generic term for any state regulatory body charged with regulating intrastate utilities, including telecommunications. *Note:* In some states this function is performed by public service commissions or state corporation commissions.
- queue** A collection of items, such as telephone calls, that is arranged in sequence. *Note:* Queues are used to store events occurring at random times and to service them according to a prescribed discipline that may be fixed or adaptive.



**radio channel** An assigned band of frequencies sufficient for radio communication. *Note:* The width of a channel depends upon the type of transmission and the frequency tolerance. A channel is normally assigned for a specified type of service by a specified transmitter.

**radio common carrier (RCC)** A common carrier engaged in the provision of Public Mobile Service, which is not also in the business of providing landline local exchange telephone service. These carriers were formerly called "*miscellaneous common carriers.*" (CFR 47)

**RAM** Acronym for random access memory.

**random access memory (RAM)** High-speed read/write memory with an access time that is essentially the same for all storage locations.

**read-only memory (ROM)** A memory in which data, under normal conditions, can only be read.

**Regional Bell Operating Companies (RBOCs)** The seven holding companies, formed from the divestiture action of the American Telephone and Telegraph company, into which the Bell System's local telephone companies were assigned.

**remote access** 1. Pertaining to communication with a data processing facility through a data link. 2. A PABX service feature that allows a user at a remote location to access PABX features by telephone; e.g., WATS lines. *Note:* Individual authorization codes are usually required.

**repeater** A device that amplifies an input signal or, in the case of pulses, amplifies, reshapes, retimes, or performs a combination of any of these functions on an input signal for retransmission. *Note:* It may be either one-way or two-way type.

**resale carrier** A company that redistributes the services of a commercial carrier and retails the services to the public.

**resale service** In Federal Communication Commission deliberations and rulings, the right of a buyer of basic telecommunication services, such as private lines, foreign exchanges, or WATS, to resell and/or share with others the unused capacity.

**satellite** A body which revolves around another body of preponderant mass and which has a motion primarily and permanently determined by the force of attraction of that other body.

**satellite Earth terminal** That portion of a satellite link that receives, processes, and transmits communications between Earth and a satellite.

**satellite link** A radio link between a transmitting Earth station and a receiving Earth station through one satellite. A satellite link comprises one uplink and one downlink.

**scrambler** A device that transposes or inverts signals or otherwise encodes a message at the transmitter to make it unintelligible at a receiver not equipped with an appropriately set descrambling device.

**SLIP line: Serial Line Internet Protocol** Allows a computer to utilize the Internet protocol (IP) with a standard phone line and high-speed modem.

**specialized common carrier (SCC)** A common carrier offering a limited type of service or serving a limited market.

**standard** 1. Guideline documentation that reflects agreements on products, practices, or operations by nationally or internationally recognized industrial, professional, trade associations or governmental bodies. *Note:* This concept applies to formal, approved standards, as contrasted to de facto standards and proprietary standards,



which are exceptions to this concept. **2.** A document that establishes engineering and technical requirements for processes, procedures, practices, and methods that have been adopted as standard. **3.** An exact value, a physical entity, or an abstract concept, established and defined by authority, custom, or common consent to serve as a reference, model, or rule in measuring quantities or qualities, establishing practices or procedures, or evaluating results. A fixed quantity or quality.

**star network** A radial (starlike) configuration of communication-network nodes such that there is a direct path between each node and a central node that serves as a central distribution node.

**station 1.** One or more transmitters or receivers or a combination of transmitters and receivers, including the accessory equipment necessary at one location, for carrying on radio communication service. Each station will be classified by the service in which it operates permanently or temporarily. *Note:* The use of the term is not limited to radio applications.

**telecommunication 1.** Any transmission, emission, or reception of signs, signals, writing, images and sounds or intelligence of any nature by wire, radio, optical or other electromagnetic systems. **2.** Any transmission, emission, or reception of signs, signals, writings, images, sounds, or information of any nature by wire, radio, visual, or other electromagnetic systems.

**telecommunication service 1.** Any service provided by a telecommunication provider. **2.** A specified set of user-information transfer capabilities provided to a group of users by a telecommunication system. *Note:* The telecommunication service user is responsible for the information content of the message. The telecommunication service provider has the responsibility for the acceptance, transmission, and delivery of the message.

**teleconference** A conference between persons remote from one another but linked by a telecommunications system. *Note:* The conference is supported by audio and/or video communication equipment that enables the live exchange of information among remotely located persons and machines.

**telemetry** The use of telecommunication for automatically indicating or recording measurements at a distance from the measuring instrument.

**Telnet** Allows one internet computer to log on to other internet computers. Users can then execute programs stored on the remote computer.

**telephony** A form of telecommunication set up for the transmission of speech or, in some cases, other sounds.

**teleprocessing** The combining of telecommunications and computer operations interacting in the automatic processing, reception, and transmission of data and/or information.

**time-division multiple access (TDMA)** A communication technique that uses a common channel (multipoint or broadcast) for communication among multiple users by allocating unique time slots to the different users. *Note:* Used extensively in satellite systems, local area networks, physical security systems, and combat-net radio systems.

**time-division multiplexing (TDM)** A method of deriving two or more apparently simultaneous channels from a given frequency spectrum of a transmission medium connecting two or more points by assigning discrete time intervals in sequence to each of the individual channels. During a given time interval the entire available frequency spectrum can be used by the channel to which it is assigned. *Note:* In general, time-division multiplexing systems use pulse transmission. The multiplex pulse train may be considered to be the interleaved pulse trains of the individual channels. The individual channel pulses may be modulated either in an analog or a digital manner.



- traffic** 1. The information moved over a communication channel. 2. A quantitative measurement of the total messages and their length, expressed in CCS or other units, during a specified period of time.
- transmission** 1. The dispatching, for reception elsewhere, of a signal, message, or other form of information, e.g., telegraphy, telephony, or facsimile, by means of wire, optical fiber, or radio. 2. The transfer of electrical power from one location to another over conductors.
- trunk** 1. A single transmission channel between two points that are switching centers or nodes, or both. 2. [A] circuit between switchboards or other switching equipment, as distinguished from circuits which extend between central office switching equipment and information origination/termination equipment. (CFR 47)
- ultra high frequency (UHF)** Frequencies from 300 MHz to 3000 MHz.
- user** 1. A person, organization, or other entity (including a computer or computer system), that employs the services provided by a telecommunication system, or by an information processing system, for transfer of information to others. *Note:* A user functions as a source or final destination of user information, or both. 2. In automated information systems, a person or process accessing an automated information system by direct connections (e.g., via terminals), or indirect connections (i.e., prepare input data or receive output that is not reviewed for content or classification by a responsible individual).
- value-added carrier** A company that sells the services of a value-added network.
- value-added network (VAN)** A network using the communication services of other commercial carriers, using hardware and software that permit enhanced telecommunication services to be offered.
- video signal** A signal normally used to transmit changing pictorial information in real time. *Note 1:* The video signal bandwidth depends upon the mode of transmission, e.g., slow-scan TV, full-scan, or digitized full-scan. *Note 2:* This definition describes the generic signal between a transmitter and receiver.
- videotext** Pertaining to a type of communication service in which a user can access a remote database and receive the requested data on the user's video display. *Note:* The database information is transmitted to the user's video display over a separate channel that may be a commercial carrier channel.
- view** In satellite communications, the ability of a satellite Earth terminal to "see" a satellite, having it sufficiently above the horizon and clear of other obstructions so that it is within a free line of sight from the satellite Earth terminal. *Note:* A pair of satellite Earth terminals has a satellite in "mutual" view when both have unobstructed line-of-sight contact with the satellite simultaneously.
- wide area network (WAN)** A physical or logical network that provides capabilities for a number of independent devices to communicate with each other over a common transmission-interconnected topology in geographic areas larger than those served by local area networks. *Note 1:* A user may describe a collection of physical networks, e.g., ISDN, X.25, T1, as the user's logical WAN environment. *Note 2:* A MAN is a special case of a WAN in which the area covered is a metropolitan area. WANs may be country-wide or world-wide.
- Wide Area Telephone Service (WATS)** A toll service offering for customer dial-type telecommunications between a given customer [user] station and stations within specified geographic rate areas employing a single access line between the customer [user] location and the serving central office. Each access line may be arranged for either outward (OUT-WATS) or inward (IN-WATS) service, or both. (CFR 47) *Note:* The offering is for fixed-rate inter- and intra-LATA services measured by zones and hours.
- wideband** 1. An imprecise designation of a signal that occupies a broad frequency spectrum. *Note:* This term is often used to distinguish it from a narrowband signal, where both terms are subjectively defined relative to the



implied context. 2. That property of any circuit having a bandwidth wider than normal for the type of circuit, frequency of operation, and type of modulation carried. *Synonym* **broadband**.

**World Wide Web (WWW)** A system that allows hypertext searches of databases on the Internet.





## **IITF COMMITTEE REPORT**

**August 10, 1994**

**IITF:** The Information Infrastructure Task Force (IITF), chaired by Secretary of Commerce Ronald Brown, was held on July 26, in the Indian Treaty Room of the Old Executive Office Building. The IITF Committee Chairs provided an overview of their ongoing activities as well as recent accomplishments of their respective Committees.

The Task Force voted to approve two draft reports for public comment: (1) the Committee on Applications and Technology's Second Series of "NII Application Papers" and (2) the Government Information Technology Services Working Group's draft strategic report on "A Vision for Government Information Technology Services and the NII." The Task Force also approved the Telecommunications Policy Committee's summary report on "The NII Field Hearings on Universal Service and Open Access" to be released for public comment in early September. Secretary Brown discussed the Global Information Infrastructure initiatives, the FY96 IITF Budget Cross-Cut activities, and the NII first anniversary activities.

**NII Advisory Council:** On September 13, the NII Advisory Council (NIIAC) will hold its fifth meeting at the New York Public Library in New York City, from 8:30 a.m. to 4:30 p.m. The NIIAC will be addressed by Secretary Brown and the meeting will focus on the status of the individual Mega-Project work plans. The three Mega-Projects (Vision and Goals; Access; and Privacy, Security, and Intellectual Property) will meet on September 12 at Columbia University, New York, New York.

**Applications Conference:** On September 7 and 8, the Council on Competitiveness and the IITF will co-sponsor an applications conference entitled "Breaking the Barriers to the National Information Infrastructure." The conference will be held at the ANA Hotel in Washington, D.C. and will explore the range of applications being developed for the NII, with a special focus on obstacles faced by both developers and end users of such products.

This is the ninth monthly Information Infrastructure Task Force (IITF) Committee Report produced by the NII Secretariat at the National Telecommunications and Information Administration (NTIA) at the Department of Commerce. Please submit Committee and Working Group approved minutes of meetings, schedules of upcoming events, and any information regarding the IITF Committee Report to Yvette Barrett, 202/482-1835 (office), 202/482-0979 (fax) or [ybarrett@ntia.doc.gov](mailto:ybarrett@ntia.doc.gov) (e-mail).

Information regarding the IITF Bulletin Board System (BBS) should be submitted to Charles Franz at NTIA either via e-mail ([cf Franz@ntia.doc.gov](mailto:cf Franz@ntia.doc.gov)) or floppy disk in Word Perfect or ASCII formats. The IITF Bulletin Board can be accessed through the Internet by pointing your Gopher Client to [iitf.doc.gov](http://iitf.doc.gov) or by telnet to [iitf.doc.gov](http://iitf.doc.gov) and login as gopher. The Bulletin Board is accessible at 202/501-1920 using a personal computer and a telephone modem.



**National Information Infrastructure Symposium:** On October 17-19, the President's National Security Telecommunications Advisory Committee (NSTAC) and the Office of Science and Technology Policy will hold a symposium at the U.S. Naval War College, Newport, Rhode Island. The purpose of the symposium is to provide an opportunity for senior members of the Administration to meet with industry leaders to discuss key national security issues related to the NII.

### **Information Policy Committee**

The Information Policy Committee (IPC) last met on June 15th to hear the progress reports from its Working Groups, to review the intellectual property rights report, and to be briefed on the NII Security Issues Forum.

The Intellectual Property Rights (IPR) Working Group released its preliminary report on July 7, 1994, on the extent to which legislative changes, technical controls, and educational initiatives may be needed to assure the protection of intellectual property rights in the National Information Infrastructure. The report, which proposes minor legislative changes to the copyright act, was issued in preliminary draft form to solicit additional public comment. Written comments on the report may be submitted on or before September 7.

Additionally, the IPR Working Group will hold three public hearings this fall in Washington, D.C., Chicago, and Los Angeles. The dates and locations of the hearings have not been finalized. After the comment period closes and the hearings are over, the IPR Working Group will finalize the report. The release date of the final report will depend in large part on the number of comments, the amount of testimony the group receives, as well as the incorporation of technology concerns.

The Government Information Working Group (GIWG) has formed a subgroup called the Electronic Record FOIA Legislative Group. It is chaired by Dan Metcalfe of the Department of Justice. GIWG is considering possible legislative proposals to amend the Freedom of Information Act (FOIA) with respect to the subject of electronic records. The Working Group is meeting weekly as it develops general principles for the treatment of records in an electronic age.

GIWG's work on the Government Information Locator Service (GILS) is progressing well. NIST published a draft Federal Information Processing Standard (FIPS) incorporating the GILS Application Profile in the Federal Register on July 5, 1994 (59 FR 34412). Comments are due October 3, 1994.

Publication of an OMB Bulletin to prescribe the implementation timetable for GILS and to articulate agency responsibilities will be timed to coincide with publication of the final FIPS, possibly as early as November. The draft Bulletin has already been circulated to the agencies for comment. Public comment will be solicited from the participants in the OMB-



sponsored public meeting on GILS which was held in December. The draft bulletin will also be on the FedWorld and IITF bulletin board systems for comment.

Some preliminary implementation steps are already under way. The Commerce Department has its prototype Commerce Information Locator System (CILS) up and running on FedWorld. Also, the Internet-based agency "Home Page" initiative utilizing the Mosaic application is being designed to have a specific GILS link so that users will ultimately be able to go directly from the "Home Page" to the agency's GILS Core Locator. The "Home Page" has been demonstrated to agencies and will be unveiled publicly in the fall.

The Privacy Working Group extended the public comment period for its *Principles for Providing and Using Information* to July 1, 1994. By that date, 22 commentors had provided comments. Most of the comments came from the private sector although some public interest groups and government organizations also submitted comments. All of the comments have been placed in the OIRA Public Docket Room at the New Executive Office Building for public inspection. The Working Group is currently analyzing the comments and intends to meet in two weeks to discuss them and begin to amend the *Principles* as appropriate.

### **NII Security Issues Forum**

On July 15, the Security Issues Forum and the Mega-Project on Privacy, Security and Intellectual Property of the NII Advisory Council jointly sponsored a public meeting concerning security on the NII. The intent was to begin a dialogue with the public regarding security issues. The presenters were asked to discuss their use of the NII, the security exposures or risks that are of concern to them, and possible approaches needed to address those risks.

The meeting generated considerable public interest -- 30 people representing diverse groups presented position papers, several hundred members of the public attended, and several people from the audience commented on the presentations. Participants continually underscored that (1) the public and industry were greatly concerned about security issues and (2) there was a tremendous need for a dialogue on this issue. Although the private sector is already developing security solutions in some areas of use, the Federal government will have a role. For example, there is an important government role in assuring availability and recoverability of the NII in the case of a natural disaster, in establishing a public key infrastructure, or working on participant liability issues.

The Forum will soon announce the availability of both an electronic mailbox and a regular mailbox where the public can send statements and comments regarding security issues. In addition, the Forum is considering a second meeting for this fall or early winter, outside of the D.C. area. The National Security Telecommunications Advisory Committee (NSTAC) is planning a joint industry-government Symposium in October to discuss a number of NII



security-related issues. Next month's meeting of the Forum, which is scheduled for August 10, will be used to assess areas where Federal action is already apparently needed. A summary of the proceedings will be made available through the IITF bulletin boards, as well as in hard copy. A copy of the proceedings will also be sent to all IITF members.

### **Committee on Applications and Technology**

The Committee on Applications and Technology has focused on several activities during the month of July: the second set of application papers, the IITF budget cross-cut activity, and the working group meetings. CAT met on July 27 at the Department of State. The next CAT meeting will be held at NIST in Lecture Room B on September 9 from 1:30-4:00 p.m. At 2:45 p.m. the meeting will be open to the public for a presentation by the Mayo Clinic on its activities with respect to health care and the NII.

During the public portion of the July CAT meeting, Frank Brake, Managing Director, International Operations, Newport News Shipbuilding, provided an interesting presentation on the use of information technology and the information infrastructure in the manufacturing application area.

The IITF approved distribution of the second set of application papers during its July meeting. The set of eight papers will be published under the title "The Information Infrastructure: Realizing Society's Goals," and released for public comment in early September. The eight application topics are: transportation; telecommuting; local, state, and federal emergency management; supply and demand of electrical power; public empowerment with environmental information; people with disabilities; arts, humanities, and culture; and public safety and law enforcement. These papers are designed to spur public discussion of how people and organizations use the information infrastructure to improve the quality of life. Paper copies of the document will be distributed through GPO and NTIS. Electronic copies will be available through the IITF information server.

At the request of Secretary Ronald Brown, and then-OMB Director Leon Panetta, CAT will lead the IITF budget cross-cut activity. Coordinators, selected from CAT participants, who will organize the submissions into the appropriate application areas. CAT has developed a practical framework for organizing agency submissions. By the end of July, CAT had received a summary of the key policy and programmatic initiatives from 13 agencies, and is working with OMB to make contact with the other agencies to request their information.

The Government Information Technology Services Working Group, chaired by Jim Flyzik, met on July 7, 1994. Key issues discussed included: improved information technology training for federal managers and employees, initiatives for improving customer service, implementation of government-wide electronic mail, consolidation of federal data centers, pilot project for demonstration of the innovation fund concept, and progress in developing an international trade data system, and organizing a national environmental data index.



The GITS Working Group "Vision" document and "Action Plan" were presented to, and approved for public distribution by, the IITF at its July meeting.

On October 11-13, the Federation of Government Information Processing Councils, Public Technology, Inc., and the State Information Policy Consortium, in collaboration with the GITS Working Group, will sponsor Interchange '94 at the Renaissance Hotel and Washington Convention Center, Washington, DC. Interchange '94 will bring together information technology policy makers from federal, state, and local governments and IT industry executives to collaborate on initiatives that further the goals of the NII.

The next GITS Working Group meeting is August 9, at the Federal Trade Commission, Room 432, from 9:00 a.m. to 12:00 p.m. The GITS Working Group is also scheduled to meet on September 8 from 9:00 a.m. to 12:00 p.m. at a location to be announced.

The Technology Policy Working Group (TPWG), chaired by Duane Adams, met on July 7 and July 28. Future meetings are scheduled for August 18 and September 2. The following provides updates on the activities of the four subgroups of the TPWG.

**NII Roadmap:** The Working Subgroup asked the National Research Council to undertake the Roadmap project. The Council will assemble a panel from industry and academia to develop the roadmap via an open process with the greatest possible participation of industry.

**NII Services Architecture:** A document highlighting the TPWG's recommendations regarding the services project, was issued in draft form for internal review in July.

**Advanced Digital Video:** The Report of the Workshop on Advanced Digital Video in the National Information Infrastructure was issued in electronic form in July. The report is available on the World Wide Web using the Mosaic user interface. The document is available through the IITF information server.

**Standards Process:** The first formal meeting of the project team was held on July 14. The first public activity of TPWG for the standards project was the co-sponsorship of a Workshop on Standards and the NII in June. In July, the team participated in the first meeting of the American National Standards Institute (ANSI) Information Infrastructure Standards Panel (IISP). After conversations with TPWG, IISP was established by ANSI to facilitate and expedite the development of NII standards.

In addition, TPWG co-sponsored the Workshop on Economics of Information Infrastructure on July 21 with the National Science Foundation and the Harvard Kennedy School. Leading economists and policy specialists in academia and the federal government were invited to discuss long-term research issues in an informal, off-the-record session. The workshop will help lay groundwork for a larger Forum on the economics of information infrastructure to be held in early 1995. The July workshop examined the extent that economic analysis is able to aid policy development for an expanded information



infrastructure and to consider what new resources and tools are needed. A workshop report will be published in Fall 1994.

The Health Information and Applications Working Group (HIA WG) met July 18, 1994 at ARPA. New agency representation was recognized by the chair: Department of Defense Health Affairs; Department of Education. The telemedicine subgroup reported on their July 15 meeting in which it began to design an operational definition of telemedicine and a roadmap for its activities. The consumer health informatics sub-group reported on the coordination between the National Health Information Center and HCFA in disseminating health information to the public. They are also planning to conduct an inventory and taxonomy of HIA WG agency initiatives in this area. The issues sub-group held its first meeting to generate issues for the HIA WG to consider over the next 6 months and a roadmap which will prioritize these issues. The set of issues was distributed to the HIA WG participants for their review. The standards sub-committee co-chairs announced that they will submit a finalized standards outline for HIA WG review by September 1.

The OMB request for NII budget cross-cut proposals was discussed. The HIA WG will develop several high impact inter-departmental projects for FY97. A subgroup was formed to assist on this issue.

John Silva, HIA WG chair, testified on behalf of the HIA WG before the VA Oversight and Investigations Sub-Committee. Linda Harris testified before a Joint Economic Committee Regional Hearing in New Mexico on HIA activities on July 30.

An invitational workshop on telemedicine, sponsored by the HIA WG and the telemedicine subgroup, will be held August 8-9. This workshop will be the first public-private effort of the HIA WG.

The next HIA WG meeting is scheduled for September 1.

### **Telecommunications Policy Committee**

The Telecommunications Policy Committee (TPC) met on July 14 at the Department of Commerce. TPC heard progress reports from each of its working groups. Carol Darr discussed the International Telecommunications Working Group's GII hearing held on July 27-28. Robert Portman from the Department of Labor gave a short preview of the presentation on labor issues, which was the focus of the public portion of the TPC meeting. That presentation by representatives from the Communications Workers of America and the labor community, emphasized the impact of telecommunications and information technology growth on employment.



The next meeting will take place in September and the public portion of the meeting will address the issues and concerns of the cable industry. In October, the TPC will host the broadcasting community.

The Legislative Drafting Task Force continues to hold daily conference calls and meets frequently to discuss legislative policy issues and strategy. By a vote of 423-4, the House of Representatives passed H.R. 3636, the bill addressing local competition issues. The House also passed H.R. 3626, modifying restrictions on the Bell Operating Companies, by a vote of 423-5. On the Senate side, the Commerce Committee has concluded hearings and a mark-up of the legislation is still anticipated.

The Universal Service Working Group last met on Monday, July 25, at the Department of Commerce. The Working Group provided comments on a draft "Universal Service and Open Access Overall Hearing Summary" that was distributed to the IITF at the July 26 meeting. The final document will be released in early September. Summaries of all of the hearings are available through the IITF Bulletin Board System (BBS).

The Universal Service Working Group will next meet on September 16.

The Network Reliability and Vulnerability Working Group (NRVWG) has established a working relationship with the President's National Security Telecommunications Advisory Committee (NSTAC) through its NII Task Force. As a result, the NRVWG subgroup leaders met with the NII Task Force chairs and its three subgroup chairs to discuss issues of mutual interest and to determine how to make their efforts complimentary. Members of the NRVWG also provided briefings to NSTAC and are participating in issue development for the NII Symposium, co-sponsored by the NSTAC and the Office of Science and Technology Policy, to be held October 17-19, 1994 at the Naval War College in Newport, RI.

The three NRVWG subgroups continue to address issues related to: (1) overall NII reliability for government, industry, and general users in the context of both day-to-day and emergency operations; (2) the NS/EP attributes the NII should support; and (3) protecting key network elements from unauthorized intrusion or manipulation and seeking to ensure that network management information is protected.

The NRVWG also has established a new subgroup, "Integrating Group," which will take inputs from each of the other three subgroups and meld them into an action plan that addresses all of the reliability and vulnerability concerns identified. This plan will provide a description of the problem, key issues, and necessary actions, in the areas of policy, legislation, management mechanisms, and technology. The Integrating Group will accomplish its objective by using an integrating framework that is currently in draft and being addressed by the NRVWG.

The integrating framework will identify general concepts of reliability in the NII and will provide guiding principles for government participation in the evolution of a reliable, robust,



and secure infrastructure. The action plan will identify top level actions that will be pursued by the NRVWG, in partnership with industry and government user groups. The objective will be to ensure the continuous availability of telecommunications and information services from the NII under normal and emergency circumstances.

The next NII Network Reliability and Vulnerability Working Group meeting (NRVWG) will be on August 9 at the DISA Headquarters Building in Arlington, Virginia. Dr. David Signori, Deputy Director of DISA, and chair of the NRVWG, will host the meeting.

The International Telecommunications Working Group, chaired by Carol Darr, held a public hearing entitled "The Emerging Global Information Infrastructure" on July 27 and 28. Approximately 350 people attended to listen to 29 witnesses, representing service providers, users, industry associations, and equipment and software manufacturers, testify on the component technologies of the GII, the status of the world's information infrastructure, the five principles of the GII (private investment, competition, open access, universal service, regulatory flexibility), and how best to develop a GII. A transcript of the hearing will be made available on the NTIA electronic bulletin board and in hard copy in the Department of Commerce Law Library (15th and Pennsylvania Avenue, NW).

Members of the public who wish to submit written comments on the GII in response to the Federal Register notice announcing the hearing and soliciting public comments (59 Fed. Reg. 31979, June 21, 1994) may continue to do so until August 12, 1994. All written comments should be submitted to Randall Cook, Room 5870, Office of the General Counsel, U.S. Department of Commerce, Washington, D.C. 20230.

### **Schedule of Upcoming Events**

- August 10-11:** Customer Services Enterprise Model for the Government Work Session  
USPS William F. Bolger Management Academy  
9600 Newbridge Road, Academic Bldg. Room 100  
Potomac, Maryland  
8:00 a.m. - 5:00 p.m.  
(Co-sponsored by the Customer Services Improvement Team (CSIT) of the Government Information Technology Services (GITS) Working Group and the U.S. Postal Service)
- August 18:** Technology Policy Working Group  
ARPA  
1:00 p.m. - 3:00 p.m., Room 970
- September 1:** Health Information and Application Working Group



- September 2:** Technology Policy Working Group  
ARPA  
1:00 p.m. - 3:00 p.m., Room 970
- September 7-8:** "Breaking the Barriers to the NII" Applications Conference  
ANA Hotel  
2401 M Street, NW  
Washington, D.C.  
(Co-sponsored by Council on Competitiveness and the IITF)
- September 8:** Telecommunications Policy Committee  
Department of Commerce  
Room 4830  
1:00 p.m. - 3:00 p.m.  
(Open to public at 1:45 p.m.)
- Government Information Technology Services (GITS) Working Group  
9:00 a.m. - 12:00 p.m.  
(Location TBA)
- September 9:** Committee on Applications and Technology  
National Institute of Standards and Technology  
Lecture Room B  
Gaithersburg, Maryland  
1:30 p.m. - 4:00 p.m.  
(Open to public 2:45 p.m.)
- September 16:** Universal Service Working Group  
Department of Commerce  
10:00 a.m. - 11:00 p.m., Room 3708
- October 4:** Information Infrastructure Task Force (IITF) Meeting  
Location TBA  
1:00 p.m. - 3:00 p.m.
- October 11-13:** Interchange '94  
Renaissance Hotel and Washington Convention Center  
Washington, D.C.  
(Co-sponsored by the GITS Working Group, the Federation of Government Information Processing Councils, Public Technology Inc., and the State Information Policy Consortium)
- October 17-19:** National Information Infrastructure Symposium  
U.S. Naval War College  
Newport, Rhode Island  
(Co-sponsored by the President's National Security Telecommunications Advisory Committee (NSTAC) and the Office of Science and Technology Policy)



cc: ✓ SES  
MN  
ES  
JB  
JS

**IITF HEARING ON INTERNATIONAL ASPECTS OF THE NII  
WASHINGTON, DC  
JULY 27-28, 1994**

The International Telecommunications Policy Working Group of the Information Infrastructure Task Force's (IITF) Telecommunications Policy Committee invites you to attend a public hearing on the international aspects of the NII in the context of an emerging Global Information Infrastructure (GII). The hearing will take place in the Grand Ballroom of the Georgetown University Conference Center (Thomas and Dorothy Leavey Center), 3800 Reservoir Road, N.W., Washington, DC from 9:00 a.m. to 4:30 p.m. on Wednesday, July 27 and from 1:00 p.m. to 4:30 p.m. on Thursday, July 28.

The IITF Working Group is seeking a broader understanding of the policy issues associated with the international dimension of technological convergence. The hearing will address issues and questions pertaining to international standards, the regulation of international communications and the GII.

This will be the first in a series of hearings to be held seeking public input and discussing policy issues associated the international aspects of the NII. These hearings will provide the IITF Working Group with important information to be considered in developing policies.

**To register:** Registration in advance is preferred due to limited seating. Please submit by mail or fax the enclosed registration form no later than July 22, 1994. The hearing is open to the public at no charge. All-day parking is available in lots adjacent to the Conference Center. Sign-up sheets for comments from the floor will be available at 8:00 AM the morning of the event, but space is limited. This hearing is physically accessible to people with disabilities. Requests for sign language interpretation or other auxiliary aids should be directed to Nicole Brown or Angie Mitchell at (202) 482-4772.

**Providing written testimony:** Interested parties are invited to testify and submit written comments. All requests to testify and a written copy of the testimony must be received by July 15, 1994. All other written comments must be received by August 12, 1994. Please send all testimony and written comments to Randall Cook, Room 5870, Office of the General Counsel, U.S. Department of Commerce, Washington, D.C. 20230.

If you have any questions or require additional information, please contact Randall Cook by telephone at (202) 482-0490, facsimile at (202) 501-4695, electronic mail via the Internet at rcook@doc.gov or by mail at the address listed above.

Enclosures



# IITF PUBLIC HEARING

## "EXPLORING THE EMERGING GII"

GEORGETOWN UNIVERSITY  
Thomas and Dorothy Leavey Center  
Grand Ballroom  
3800 Reservoir Road, N.W.  
Washington, D.C.

July 27 & 28, 1994

Sponsored By

The International Telecommunications Policy Working Group  
of the Information Infrastructure Task Force's (IITF)  
Telecommunications Policy Committee

### Registration Form

NAME: \_\_\_\_\_

TITLE: \_\_\_\_\_

COMPANY/AFFILIATION: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

TELEPHONE \_\_\_\_\_ FAX NUMBER: \_\_\_\_\_

AREAS OF INTEREST: \_\_\_\_\_

- ☐ I intend to provide written testimony for the record.  
☐ I do not intend to provide written testimony for the record.

Please respond by  
July 22, 1994 to:

Nicole Brown or Angie Mitchell  
Office of the General Counsel  
Room 5870, Herbert C. Hoover Building  
14th and Constitution Ave. NW  
Washington, D.C. 20230  
Voice: (202) 482-0490  
FAX: (202) 501-4695



Location

Just fifteen minutes to National Airport and five minutes to the White House

From Metro

The nearest metro stations are Rosslyn and Dupont Circle.

Walking from Dupont Circle Metro Station: Take P Street to Wisconsin Avenue and make a right, then a left on Q Street, a right on 35th Street, a left on Reservoir Road, and a left on 38th Street. You will enter in Ent. 1; the center is in back of the property.

Georgetown University Transportation System (GUTS)

This is the University bus service to the Dupont Circle and Rosslyn Metro stations. You can catch the bus at the Leavey Center, and it runs every 15 minutes from 7 a.m. to 9:30 a.m. and from 3:30 to 7 p.m., and every 30 minutes from 9:30 a.m. to 3:30 p.m. Monday thru Friday (it doesn't run on weekends). The cost is \$1 each way.

Taxi Service:

National Airport: Taxi cab fare is approximately \$10. Dulles Airport: Taxi cab fare is approximately \$40.

Parking

Covered parking is available on the premises at the rate of \$10 a day or \$1.75 per hour.

