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PLATFORM RECOMMENDATIONS

SUPPORTING MINNESOTA'S INFORMATION INFRASTRUCTURE

Report to Governor Arne H. Carlson
from the Information Infrastructure Working Group

June 1996

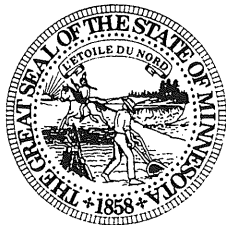
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June 18, 1996



Our mission:
To improve the quality
and productivity
of Minnesota
government.

The Honorable Arne H. Carlson
Governor, State of Minnesota
130 State Capitol
St. Paul, MN 55155

Dear Governor Carlson:

Attached are the Platform Recommendations from the Information Infrastructure Working Group that you asked me to convene late last fall. This report combines the work done by the Government Information Access Council (GIAC), along with the recommendations made by the National Information Infrastructure Advisory Council (NIIAC), into a focus or platform for the State of Minnesota to continue establishing its information infrastructure.

This working group, as you requested, had representation from many facets of the technology community. There was representation from the small and large telephone companies, the Minnesota High Technology Council, industry, university, state government and the legislature. The members of the working group spent many hours establishing this platform for the state of Minnesota.

This is not meant to be an end document; this was designed to be a beginning document. A document that can be changed to fit changing technology and technology needs of our state, but it does give us a vision and a plan on which to continue the growth of our information infrastructure in the state of Minnesota. We are the first state in the country to formulate a vision and policy consistent with that of the National Information Infrastructure.

It is with a great sense of accomplishment and appreciation to those that served on the Information Infrastructure Working Group that I present these platform recommendations to you.

Sincerely,

A handwritten signature in dark ink, appearing to read "Elaine Hansen".

Elaine S. Hansen
Commissioner

esh/mh

Platform Recommendations Supporting Minnesota's Information Infrastructure Report to Governor Arne H. Carlson

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Executive Summary:
Platform Recommendations for an
Information Infrastructure in Minnesota

Information Technology (IT) has never been more critical to quality of life and economic vitality than now, and it will increase in importance as we move into the 21st century. This is an issue that touches every citizen throughout the state of Minnesota, at work, at school and at play. It affects their well-being whether they are involved in businesses large or small, patients in a health care facility, government leaders, or individuals in the privacy of their home. The dynamic potential of the "electronic age" will be accelerated by farsighted and responsive planning, and Minnesota is positioned to lead the way.

The Information Infrastructure Working Group recommends that the following vision statement be formally adopted as a guide to that planning:

By the year 2000 - - Minnesota Will Be the Acknowledged Leader in the Use of Information Technologies for the Benefit of All its Citizens.

There are three critical aspects that state government can act on to lead the state and the nation in using the information revolution to truly benefit all Minnesotans:

- ◆ *provide leadership by facilitating partnerships and leading by example;*
- ◆ *create the information infrastructure by encouraging private sector initiative and partnering through policy, legislative and financial incentives; and*
- ◆ *assure a skilled, flexible workforce through lifelong learning.*

Leadership from government makes the difference between acting strategically to take advantage of information technology advances capable of increasing our standard of living, or barely coping with the new world of telecommunications and information technology. Although the task is massive and complex, wise decisions and investments already in place and involvement of key stakeholders will serve Minnesota well. As stated in the *Final Report from the State-Federal Technology Partnership Task Force*, (a task force created by the National Governor's Association and other organizations, on which Governor Carlson served), "government at all levels can serve as a catalyst in putting science and technology to work toward economic growth."

Genuine growth requires bold action. The conclusion of the Working Group is that experimental pilot projects should be initiated through public/ private partnerships that explore new rules for the future in a controlled environment. These pilot projects would pave the way for far-reaching reengineering changes that result in a national leadership role for Minnesota.

A platform of specific recommendations, inspired by the work completed by the **United States Advisory Council on the National Information Infrastructure**, are offered in the categories of:

- ◆ **Electronic Commerce**
- ◆ **Education and Lifelong Learning**
- ◆ **Health and Health Care -- Emergency Management**
- ◆ **Government Information and Services**

These findings are included in detail in Section II of this document. In meetings of the Information Infrastructure Working Group, and as outlined in the following report, common themes and issues emerge. Listed below are 13 overriding principles that are shared across all areas of interests:

- ▶ **economic development** must be encouraged through the creation, application, promotion and management of technology utilization and information distribution
- ▶ **technical standards** to support interoperability of systems should be required for government and encouraged for private sector
- ▶ **teacher training** in technology should be a priority
- ▶ **lifelong learning** should be supported through a public/private partnership, with recognition that the responsibility for training belongs to individuals as well as government and business
- ▶ **incentives** should be established in the private sector and the public sector to promote **conducting business electronically**
- ▶ initiate a "best practices" **clearinghouse** to share applications and training techniques and curriculum
- ▶ **Internet access** should be available for the general population on a convenient and affordable basis
- ▶ competitive **private sector leadership** should be encouraged in developing new applications and solutions
- ▶ increased investment in **research and development** in both the public and private sector is necessary
- ▶ emphasis should be put on **consumer protection, data integrity, data privacy and security**, with acknowledgment of industry, national and international standards

- ▶ standards accepted by the state should recognize **international commerce requirements**
- ▶ Minnesota should foster a **regulatory environment** that is conducive to a broad deployment of an information infrastructure through a competitive market which supports the economic and social vitality of the state
- ▶ Government's best role is as **visionary leader, as a catalyst facilitating technology advancements in the private sector, education provider and anchor tenant through aggregation of intergovernmental purchasing power**. By state government adopting emerging technologies early in the development cycle for its own use, the critical mass necessary for private enterprise to provide these new services to all Minnesota citizens will be met.

Ideas for action steps abound, and many stakeholders are poised for action. Timely decisions on strategic investments and policies to strengthen Minnesota's reputation as a national leader must be made. Our success as a state, as organizations and as individuals requires building this new infrastructure with foresight and vision. The ability to take prudent action will make the difference between leading the nation and following others' examples.

This platform of recommendations from the Information Infrastructure Working Group to the Governor will direct and strengthen a high quality of life in Minnesota well into the next century.

I. VISION AND GOALS

A. VISION

By the year 2000 - - Minnesota Will Be the Acknowledged Leader in the Use of Information Technologies for the Benefit of All its Citizens.

B. GOALS FOR THE FUTURE

The 21st century is approaching quickly, and the pace of the information revolution is so rapid that we cannot anticipate the advancements in Information Technology that will change the landscape of society forever. With that in mind, we describe the future ideal state in terms of outcomes or experiences that define the improvements that impact how people will conduct their lives in the year 2000.

In the future, Minnesota citizens will need to easily access information from all over the world. Technology will allow them to conduct business across boundaries of geography, culture, and language. Tasks that were once tedious handwork subject to human intervention can be handled effortlessly and accurately through technology, giving people increased time to devote to more rewarding and challenging activities. An increasingly electronic workplace will create opportunities to reengineer business operations. For instance, travel costs, crowded freeways, air and noise pollution can be traded for well-understood performance benchmarks.

Multimedia, mixed with computer-aided instruction and student management, will allow students of all ages to learn in a variety of settings and in a manner that best suits their needs. Students will learn based on objective measurements, and at a pace that allows them to thoroughly learn subjects rather than attain minimum standards. Students will have access to the highest quality instruction on any subject matter through the virtual classroom. Advances in communication methods will give students more opportunity for individual attention and simultaneously connect to the outside world. A clearinghouse will be available to distribute "best practices" in training and administration.

Standards for health care and public safety will reach new peaks. Medical professionals will be able to diagnose patients from a remote location. People who are dealing with ongoing health concerns, or are recuperating, will be able to be monitored from a distance. Emergency personnel, including police, firefighters and emergency medical staff, will be able to respond to life-threatening situations immediately regardless of location. Business management of health care will be supported to keep costs controlled.

A virtual single network with continuously increasing capacity will communicate across government, business and education. Interactive video meetings will permit previously inaccessible individuals to participate in public policy and decision making. An aggregated demand in the public sector will leverage purchasing power, saving tax dollars. Improved

communication between levels of government will eliminate unnecessary duplication and encourage improvements in the quality of government customer service.

The roles and responsibilities of stakeholders will become clarified, yet remain flexible enough to encourage value-added private sector initiatives while meeting public infrastructure equity needs. Methods of protecting the confidentiality and integrity of private information are necessary components. As the infrastructure evolves, the laws and policies governing the ownership and use of medical records, licensure, liability, reimbursement and other private data should evolve to be technology and location neutral.

Encryption, validation, authentication and verification methods will be used to ensure the accuracy of data. Procedures that ensure lawful use of information in business transactions will be developed, making business operations secure and ensuring the integrity of information.

Although the technology to achieve this future state may already exist in some instances, the challenge is to discover efficient and affordable ways to utilize these technologies in our everyday lives.

C. CURRENT INFORMATION INFRASTRUCTURE

Through its strong management efforts in the area of Information Technology (IT), the State of Minnesota boasts a thriving economy, fine academic institutions, and an innovative business sector. By becoming a national leader that embraces technological advancements, Minnesota is in an excellent position to continue its leadership into the 21st century. State government, industry and education have made wise investments to facilitate the development of information systems that are studied and admired by our counterparts, and in many cases we have been able to avoid pitfalls experienced in other states.

Although we have established a solid foundation for utilizing future technological advances, we face many challenges. The Information Infrastructure Working Group's enthusiastic agreement on a vision for Information Technology will help Minnesota's stakeholders move past roadblocks with creative, effective strategies. It is the group's consensus that this state has a realistic opportunity to be recognized as a pacesetter in the use of Information Technology in ways that will enhance our economy and our society.

Among Minnesota's accomplishments are a number of collaborative efforts to bring all stakeholders into the infrastructure development process. A recent legislative appropriation of \$15.5 million was made to schools and libraries for videoconferencing equipment and access to the Internet. Free public Internet access sites are available in over 62 locations through Access Minnesota. Local initiatives are growing in every corner of the state, from Crookston to Winona, to connect rural Minnesota to the Information Superhighway.

The Information Policy Office (IPO) and the Intertechnologies Group (InterTech) of the Department of Administration have played integral roles in the previously mentioned accomplishments, and will continue to have a far-reaching impact on the progress of Information

Technology in Minnesota. Because their missions include developing an interconnected information environment, providing public access to government data, facilitating fast, efficient intergovernmental communications, protecting citizens' data privacy rights, and reengineering government operations through technology, their activities are critical to Minnesota's future IT efforts. Current activities include:

- ▶ Internet connections for state agencies provided through MNet
- ▶ E-Mail connectivity provided for state agencies through the E-Mail Hub managed by InterTech
- ▶ Government Information Access Council activities to assist local government
- ▶ The Information Policy Office and InterTech are partners in Access Minnesota
- ▶ Expanded MNet capabilities, including videoconferencing
- ▶ Introduction and development of "*North Star*," the State of Minnesota's presence on the Internet
- ▶ Publication of *Statewide Policy on Technical Standards* to achieve comprehensive and multi-faceted open systems environment for the management of information
- ▶ Information Resource Manual handbook for agencies published by IPO
- ▶ Continued development of guidelines on effective information resource management

Minnesota currently has a fully digital telecommunications network. One of the world's largest, continuous fiber networks runs through the state's heartland and was started by a group of independent telephone companies organized as Minnesota Equal Access Network Services, Inc. This fiber network, in addition to the fiber networks of US WEST, Sprint/United, GTE and Frontier Communications, is the 15,000-mile fiber optic backbone that delivers many advanced telecommunications services to all of Minnesota's 87 counties.

A public videoconferencing network supports Minnesota's global economy with two-way, interactive video. This network links both public and private videoconferencing facilities. More than half of the state's 400-plus school districts avail themselves of this network to offer distance learning opportunities to students. Business, government, health care and other industries train employees, hear depositions and testimony and even conduct medical diagnostics over this videoconferencing network.

High-speed network capabilities, such as Integrated Services Digital Network (ISDN), are increasingly available to support businesses that rely on transmission systems that can carry large amounts of data among multiple locations. Frame Relay Service is an advanced service to meet the high-volume, high-speed data demands of business and government. It is a competitive service in Minnesota and is widely available from several telecommunications providers across the state.

Internet access is available statewide. Already more than 85 percent of Minnesotans have toll-free access to the Internet and that number is increasing as telephone companies and other Internet providers expand their networks. More than half of Minnesota's telephone companies are providing enhanced services such as Caller ID, call waiting and call tracing; most companies have plans to offer these services and are awaiting regulatory approvals.

By accurately recognizing the successes we have achieved as well as the challenges we face, Minnesota can formulate the strategies necessary to overcome barriers to future leadership.

D. OVERRIDING PRINCIPLES

There is a common vision of how Minnesota should take advantage of the opportunities that will develop through technology. We see tremendous potential for improved quality of life and economic vitality in our future. Our current status in business, education and government has prepared the state to reach our goals. As specific tasks begin to implement the vision, the Information Infrastructure Working Group members urge certain principles to be considered regardless of the particular discipline the tasks benefit. These principles are described in the following paragraphs.

- ▶ **Economic development** must be encouraged through a public-private partnership that utilizes technology and information distribution. Not only is technology a business in itself that should be supported, but it provides tools for other businesses. Many of those businesses that thrive will do so because of still-to-be-created technological advances.
- ▶ **Technical standards** to support interoperability of systems should be required for government and encouraged for private sector. A significant savings can be made in infrastructure, training time and expenses, and communication accuracy when there are common protocols and compatible systems in place.
- ▶ Lifelong learning is essential, and **teacher training in technology** is a priority. It is necessary for everyone to recognize that the era of education and training followed by a lifetime of work based on that training no longer is predominant. Almost everyone will need to continuously update their skills to stay current with new technologies and their applications. Training will take place in new ways, and not only do teachers need to become adept at these new ways of teaching using technology, there will be an ever increasing demand for teachers skilled in teaching information system use.
- ▶ **Lifelong learning should be supported through a public/private partnership**, with recognition that the responsibility for training belongs to individuals as well as government and business. Assuring access to all Minnesotans has multiple implications; the comfort level experience in using new information technology in the year 2000 should be equal to the average person's comfort in using the telephone today. The burden of providing this ease of use belongs to government, education, business and the individual, varying based on the age and circumstances of each person.
- ▶ **Incentives should be established in the private sector and the public sector** to promote conversion to electronic business tools. Due to the efficiency created in providing information and serving customer needs with the most productive tools available, it benefits the state as a whole to encourage those entities that can less afford

the time and expense, or may not have the expertise to use electronic business tools. Incentives should be easy to understand and competitively neutral.

- ▶ Initiate a **“best practices” clearinghouse** to share applications, training techniques and curriculum. Significant gain could be taken from a central, well-organized access point, particularly for applications and training that have been successfully field tested.
- ▶ **Internet access should be available for the general population** on a convenient and affordable basis. There is a public responsibility that geography, economics or disability should not prevent citizens from taking advantage of the capacity of information technology for education, recreation, business or services.
- ▶ **Competitive, private sector leadership** should be encouraged in developing new applications to meet the public and private sector information needs. The energy and ingenuity of the private sector are factors that support continued design, deployment and operation of the information infrastructure. Vigorous competition is essential to stimulate high quality services and innovative products.
- ▶ Investment in **research and development** in both the public and private sector should be increased. If Minnesota hopes to establish leadership, breakthrough thinking in corporate and university settings must be nurtured. Certain technologies may be so expensive or so targeted to a narrow interest group that without assistance they may not be supported by the market; however, they may be a link to more generally profitable designs and, therefore should be supported through government subsidy.
- ▶ Emphasis should be put on **consumer protection, data integrity, data privacy and security**, with acknowledgment of industry, national and international standards. This is a very complex area, and a delicate balance must be struck between practicality, convenience, and the rights of individuals and organizations. The new paradigm will require rethinking how business is conducted in our own country and the world.
- ▶ **National and international interchange should be recognized as a goal.** The global marketplace is an established reality in most businesses, and interoperability within Minnesota’s infrastructure will require an awareness of worldwide standards.
- ▶ Minnesota should foster a **regulatory environment which is conducive to a broad deployment of an information infrastructure** through a competitive market which supports the economic and social vitality of the state. Further details and specific recommendations on the topic of regulations are discussed on the following page.
- ▶ **Government’s best role is as visionary leader, as a catalyst facilitating technology advancements in the private sector, education provider and anchor tenant** through aggregation of intergovernmental purchasing power. By state government adopting emerging technologies early in the development cycle for its own use, the critical mass necessary for private enterprise to provide these new services to all Minnesota citizens will be met.

Regulation

The importance of the effect of regulation on creation and implementation of cutting edge technology must be recognized. The power to make or remove barriers to guide development is a significant role of government with far reaching results. The following points address regulation:

- ▶ Minnesota should expeditiously move toward the competitive marketplace as called for in the 1995 Minnesota Telecommunications Act and the Federal Communications Act of 1996.
- ▶ Minnesota should encourage innovation and creativity in the deployment and delivery of state-of-the-art telecommunications services throughout the state.
- ▶ State regulatory policy should be integrated into statewide information policy initiatives through collaborative decision making.
- ▶ Citizen access to the information infrastructure should be a factor that is considered in regulatory decision making.
- ▶ Minnesota should develop a leadership position in the national regulatory community through innovative and progressive regulatory policies to advance the state's information infrastructure goals.
- ▶ Use of the information infrastructure for education, medical, economic development and government purposes should be encouraged in decisions of regulators.

These overriding principles, due to their cross-cutting applicability, are priorities for action in building and supporting the Minnesota information infrastructure. As partnerships between public and private entities evolve, the periodically overlapping roles of the private sector, communities, government and individuals will strengthen the leadership needed to leap ahead in the information age.

II. RECOMMENDATIONS

A. ECONOMIC DEVELOPMENT/ELECTRONIC COMMERCE

Overview

Private sector and government must be encouraged to accelerate conducting business through electronic commerce if Minnesota envisions becoming a world-class economic center. Electronic commerce is defined as transactions between businesses, individuals, and government, using information infrastructure capabilities. There are tremendous opportunities throughout Minnesota for business development through the aggressive development and deployment of information technology. Minnesota companies could develop, manufacture and install much of these information tools.

Electronic commerce is the quintessential standard-of-living issue, and all Minnesotans are stakeholders. As was reported by the **United States Advisory Council on the National Information Infrastructure (NIAC)**, 60 percent of all jobs by the year 2000 will be in or related to the information sector. The challenge for creating high-paying jobs is relatively straightforward. Highly skilled workers who are highly motivated to be internationally competitive are critical. The creation of quality jobs is dependent on employees, who need to continuously learn and upgrade skills, as well as companies that are competitive because they can manage and direct the skills of their employees in a constantly changing environment more efficiently through the use of their information systems.

Advanced information technology is especially critical to the economic future of Greater Minnesota. Widespread access to this technology will enable manufacturing, information processing and other business types to locate facilities anywhere in Minnesota. The same technology will allow for greater choice for Minnesota residents to choose their place of residence regardless of the physical location of their employer or business customers.

Goal

To ensure that Minnesota is a world-class center for electronic commerce, thereby fostering economic development in the 21st century.

Applications

Make Minnesota the center for the development and application of tools used in conducting electronic commerce. An individual, company, industry, or state must realize that if these tools are not applied strategically, Minnesota will be at a competitive disadvantage. Development of these tools will create an ever-expanding industry.

1. Incentives should be created to stimulate Minnesota's public and private sectors to ensure Minnesota becomes a hub for electronic commerce.
2. Both the public and private sectors should be encouraged to invest in research and development related to electronic commerce.
3. The State of Minnesota and those interacting with the state should be conducting ever-increasing amounts of business electronically. This should be both the preferred and primary method of state transactions. Assistance should be provided to enable participation by small business.

Content

We should develop information and services that are dependent on electronic commerce for delivery.

1. Encourage public and private investment in both university and corporate electronic commerce research and development.
2. Government should implement a procurement process that takes advantage of electronic commerce.
3. Both the public and private sectors need to develop and use methods that ensure consumer protection.
4. The state should require, for its own purposes, usage of technical standards that are broadly accepted internationally. Businesses should be encouraged to develop and use open standards.

Physical Infrastructure

A superior information infrastructure that supports electronic commerce throughout the state is critical.

1. State government should require usage of technical standards that are internationally accepted to facilitate international trade.
2. State government should embrace open competition between many potential providers from many different industries.
3. State government should intercede only when the market fails to achieve cost-competitive, affordable services within the reach of citizens.

Training and People

Minnesota must prepare all of its citizens to effectively design, manufacture and/or utilize the information technology of the 21st century. This will help build an environment in which Minnesota can be competitive in the global economy. Workforce skill must continue to be the greatest strength in the Minnesota economy.

1. All education systems should incorporate instruction using information technology tools.
2. Business and educational institutions must provide gateways to facilitate lifelong learning. Citizens, however, must be responsible for their own learning and for keeping updated skills.
3. Information and assistance should be directed to small business owners to enable them to shift business practices to take advantage of information technology.

B. EDUCATION AND LIFELONG LEARNING

Overview

Use of the information highway requires education and lifelong learning to support stakeholders' participation in bringing the potential to reality. Not only has this shift to the electronic age created enormous demand for consumers of information to learn new skills to perform everyday tasks, but the opportunity to teach in new ways through the use of technology is expanding exponentially.

It will benefit all Minnesotans to ensure that a broad base of our citizens is prepared to function in a knowledge-based workplace, and that education and lifelong learning opportunities are responsive to the diverse and quickly changing business and learning conditions. An environment that fosters the exchange of ideas and knowledge, coupled with ready access to the information infrastructure, will prepare the state's citizens for the most effective methods of learning and retaining a high quality of life.

Goal

Minnesota will lead in the creation of lifelong learning opportunities for its citizens through the effective and innovative use of information technologies.

Applications

Promote better public and private educational services by stimulating the application of information technologies.

1. Application areas in which private sector development should be encouraged and public sector utilization should be directed:
 - a. Multimedia curriculum development and delivery
 - b. Communication:
 - instructor to instructor
 - instructor to student
 - student to student
 - instructor to parent or guardian
 - c. Academic research
 - d. Distance learning
 - e. Instruction services administration
 - f. Student testing and instructor certification
 - g. Student (learner) records

2. The State should create and maintain a “best practices” clearinghouse related to the application of information technology to training and administration.
3. The State should provide Internet access to the general population through public facilities such as libraries.
4. Industry should partner with the University, MnSCU and other public and private educational institutions to develop shared employee training applications that can be made available statewide.
5. State should provide tax incentives to companies that invest in the training and development of their employees.

Content

Create an environment that fosters the exchange of ideas and knowledge.

1. State government should facilitate the transfer of knowledge to users from state-funded entities, such as the University, MnSCU and the public school system as well as government departments and agencies, through private industry.
2. State government should create and maintain an information clearinghouse on educational content providers and their products.
3. State government should encourage the exchange of content throughout the public education system by making multimedia curriculum development tools available in every school.
4. Interested parties representing both public and private education should develop a rating and/or certification system for electronically distributed educational curriculum (creating a “Minnesota Seal of Approval”).

Physical Infrastructure

Provide each citizen with ample opportunity to access the information infrastructure.

1. State government should fund the provision and ongoing support of basic infrastructure for every public school student and facilitate private school efforts to do the same by providing low-cost network access options.
2. State government should promote interoperability standards among all educational delivery systems (public, private and industrial).
3. State government should maintain an information clearinghouse related to physical infrastructure for education.

4. State government should develop integrated physical infrastructure requirements and architecture for public education and aggregate its demand for the same.

Training and People

Prepare the state's citizens for information technology-based learning.

1. Minnesota's public school system should develop ongoing training programs for its teachers on information technology-based instruction.
2. Industry and school system representatives should work together to develop (and periodically update) curriculum that will teach students how to make the most of today's information technology tools and services.
3. Minnesota's K-12 and higher education school systems would jointly fund the development of an "intranet" that will simplify and facilitate resources access by students and teachers.
4. Public school administrators must be exposed to the impact that the revolution in information technology is having on education.
5. The general public needs to be made aware of the role information technology will play in redrawing the boundaries of education to encompass lifelong learning.

C. HEALTH AND HEALTH CARE -- EMERGENCY MANAGEMENT

Overview

Health care informatics and information technologies are initiating significant changes integral to health care access, delivery and management. As a recognized center of health care excellence, Minnesota's potential role in the transformation of health care with information technologies is tremendous. With supporting infrastructure and collaborative development efforts, Minnesota's worldwide leadership in health care informatics, telemedicine, distance learning for health care professionals and patient education and research can be developed.

Health care expertise appropriately interlinked with homes, schools, libraries, hospitals, clinics, nursing homes, businesses and government can improve health throughout Minnesota. Access to an amazing variety of public and private information resources can bring valuable information to guide decisions of caregivers, researchers, equipment and pharmaceutical manufacturers, policy makers, health insurers and plan developers, and patients, families and consumers prior to treatment. This information can affect how people participate in their own wellness, empowering patients and improving their quality of life and enabling significant economic benefits. Information technology can deliver entirely new training techniques, including such concepts as virtual surgeries. These virtual techniques replicate real-world situations and enable riskless and effective training experiences. Digital records can improve real-time access to critical information for decision making in diagnosis and care, emergency response, and public health. Electronic data interchange can reduce costs and improve efficiencies in conducting the business of health care. Outcomes management, expert systems, pre-treatment planning, and quality of life factoring will enhance aspects of health care, including laboratory information, ambulatory care, home health care, pharmacy, behavioral/mental health informatics and non-traditional medicines.

Goal

Minnesota will be the recognized leader in the application of technology and informatics to health and health care.

Applications

Public and private partnerships should create an environment in which the integration of information technology and health care will flourish and deliver a broad spectrum of applications and products that improve health in Minnesota.

1. The private sector should continue to take the lead in developing value-added information applications in support of health decision making for caregivers and consumers and in providing those services over competitively provided information infrastructures.

2. State government, in partnership with the private sector, should facilitate and promote the use of electronic communications that support the efficient exchange of health care information among providers, organizations and individuals in the state.
3. State government should maintain policies that assure the competitive advantage of medical information resides in the use of the information to improve patient care and services, and not in the proprietary ownership and control of the data or the network infrastructure.
4. All partners should facilitate and promote the use of Electronic Data Interchange (EDI) for business, clinical, provider, patient and public data exchange.
5. Research and development funding from government should be targeted toward collaborative, precompetitive, industry-led initiatives that can accelerate near-term availability and application of information technology.

Content

State government, in conjunction with the private sector, must create an environment that encourages the innovative use and processing of information; promotes economic development of health informatics, information content, software tools, and educational materials; assures open exchange of information and ideas; encourages standards for the interchange of data; and promotes private sector competition and research.

1. Health care and medical expertise should be recognized as a state asset by incenting investment in research and commercial development that promote the use of information technologies for remote access and delivery of health care and education.
2. Government systems that utilize or deliver health services should, wherever possible, procure commercially available, competitively developed solutions and technologies.
3. Using the information infrastructure, all providers of health services and users and consumers of health services, should have access electronically to the kind of information resources that guide improved decision making.
 - a. Health care organizations in the state shall continue to work collectively to identify, capture, maintain, and exchange selected and agreed-upon data elements for public health and emergency care.
 - b. Collection, conversion from paper records, and archival and storage of health care records in electronic form should be promoted and enabled.
 - c. The information infrastructure represents an opportunity for vital information to be exchanged under diverse circumstances. Community-based, in-home, and voluntary support services, done in cooperation with recognized authorities, that may help

save lives and property and promote prompt and effective recovery, particularly during emergencies or disasters, should be supported.

4. State government should require the usage of standards that are nationally and internationally accepted to facilitate the exchange of health care information. Health care providers and services should use, and be encouraged to develop, standards. State government should facilitate the development of standards.
 - a. Widespread adoption of private sector developed standards and standardized protocols should be encouraged in the following areas:
 - * Nomenclature, coding and structure
 - * Content of specific data sets or pieces of information
 - * Electronic data interchange of patient care and other health informatics
 - * Electronic signatures and authentication
 - * Personal identification methods (including patient card systems)
 - * Security and protection of digitized data.
 - b. Standards should be adapted to achieve common protocol and standards for interchange of information for laboratory systems, clinical health care, emergency medicine and public health, including provider and patient identification and authentication, disidentification of data, and responsiveness.
 - c. Standards and practices consistent with legal requirements, technical methods, and public welfare must be established for the archival and storage of health care records.

Physical Infrastructure

Minnesota should ensure that a world-class information infrastructure and highly developed policies are implemented to promote health care access and delivery, electronic commerce, health care informatics, advanced application development, and medical research.

1. Public policies should support commercially available, open systems, standards-based, interconnected, and interoperable applications and networks. The architecture must support high-transaction volumes, large multimedia transactions with low latencies and low error rates, as well as broadband video broadcasts.
2. The availability of and accessibility to an integrated health care telecommunications infrastructure that links consumers, providers, employers, health plans, government, and other community organizations is critical to health care system efficiency and the improvement of health care service quality.
3. The information technology physical infrastructure needs to be broadly available across the geography of Minnesota.

4. Emergency management should have sufficient capacity and resources to collect and exchange information that promotes the health, emergency care, and well-being of the people.
5. The capabilities of the infrastructure should be available as a tool to enhance medical, health care, wellness, provider and patient education.
6. Requirements and public policies should be adopted to achieve common protocol and standards for interoperability for clinical and laboratory informatics, medical imaging, emergency management, public safety and public health.

Training & People

Minnesota should establish world leadership through investment, incentives, and collaborative development of a highly skilled and knowledgeable workforce in health care, information technologies, and health care informatics.

1. Health care and medical training experts and educational institutions should be encouraged to produce educational materials and programs and to research effective use of information.
2. Government at all levels should encourage the availability and dissemination of public health information to all persons in a wide variety of formats and sources, using a variety of information infrastructures. ("Public health information" refers to aggregated information about diseases or health conditions provided to the public for primarily educational or informational purposes.)
3. Schools of nursing education, medicine, and professional development programs for all caregivers and health administrators should integrate access and utilization of their information infrastructure in current and ongoing medical programs.
4. The private sector investment in human capital through training and education should be incented.
5. The private sector should be encouraged to work with educational institutions in adapting their instructional materials for educational purposes.
6. Statewide accreditation and credit bank programs that allow educational credits to be earned through multiple educational institutions should be adopted to promote use of distance learning and computer delivered training, education, and lifelong learning experiences.

D. GOVERNMENT INFORMATION SERVICES

Overview

The role of government in the evolution of an information infrastructure is critical. As catalyst and facilitator, government can bring together the many interests of commerce, education, health care and the general citizenry to create a public/private commission. That body, with the leadership of a Governor's Office staff person acting as advisor and coordinator, can direct the impact of government incentives, regulation and policy.

Responsibilities for this commission would include the identification of the Internet as the delivery mechanism, and the definition of incentives for economic development through electronic commerce.

Government is also a major source and consumer of information. Rather than building its own network, state government should be an anchor tenant within a commonly available system. An important challenge will be the identification, definition, development and utilization of electronic information and services to allow the efficient transfer of information to citizens and businesses, including stakeholders in education, health care and commerce.

Goal

By the year 2000, provide an electronic infrastructure for the delivery of government information and services to all citizens.

Applications

Increase the efficiency and accessibility of government services by encouraging the widest possible number and diversity of uses of electronic information exchange with business, other organizations and individual citizens.

1. The enormous scale of public purpose in the application of information infrastructure within government is significant. Policies, laws and regulations that further define and enhance the use of statewide electronic public access for the highest quality of life and participation of all citizens should be an immediate priority for state government.
2. All citizens, regardless of geographic, physical, cultural, socioeconomic status or other barriers should have equitable and affordable access to government information and services.
3. An information infrastructure for government should establish the more cost-effective services through encouraging government employees to work at greater efficiency, promote the availability of government-collected data to citizens, and allow services to become available to citizens in a more convenient and accurate manner than ever before.

Content

Government is one of the largest collectors and disseminators of information in the United States. Information is increasingly being collected in electronic form, which allows for information to be easily shared. As a result, an information industry has emerged which contributes to America's productivity, competitiveness and employment. This information industry is growing both nationally and globally. Minnesota can foster this rich information industry within the state by:

1. Promoting open access policies to government information.
2. Encouraging the private sector to take the lead in providing value-added information and services. Entrepreneurs should be encouraged to organize, add value and offer information and services to specialized audiences. Whenever possible, government services should utilize commercially available, competitively developed solutions and technologies. Interactive capability that allows organizations and individuals to complete applications and submit required information from remote locations and at any time of the day or week should be supported wherever feasible. Such capability may include licensing applications, applications for aid programs and tax filing.
3. Completing a needs analysis to determine where limited financial resources should be diverted in providing citizens additional information and services.
4. Continue to safeguard with new technologies the integrity and security of information.

Physical Infrastructure

Requirements for distribution should include the use of a common carrier and use Internet as the standard data delivery method.

1. A public/private commission should be appointed that determines how to provide incentives for economic development purposes to support the physical infrastructure required for government to quickly establish the needed linkages to the originators and end-users of government information. Such incentives could include tax breaks or public bonding.
2. Existing regulations that discourage economic development in this arena should be reviewed by this commission for revision.

Training and People

Government should sponsor training to assure that people will be knowledgeable regarding information access as new information and services become available to the public.

1. Legislators should have ongoing education in order to appropriately fund information infrastructures and related training.
2. Citizens should be provided with the appropriate training, assistance or information in order to understand and use the services and information available.

III. CONCLUSIONS/NEXT STEPS

This report contains dozens of action steps and ideas, all of which are important to a proactive approach to getting ahead of the information age curve, or at least staying with the action. It is gratifying to have the input and interest of diverse stakeholders, as well as their commitment to the immense effort it will take to confront the issues effectively. However, the task of guiding and developing the information infrastructure can seem overwhelming without a manageable focus.

The new era of information surely calls for new rules. Endless debate will ensue as to what new regulations, policies, incentives should be implemented, and precious time will slip away if we try to meet all stakeholders' interests equally. In our market-driven economy, some, but not all, stakeholders will survive.

It is the sense of the Information Infrastructure Working Group that bold leadership is needed. Decisions and actions that truly impact Minnesota's position in the future may be unpopular, as often happens with action that is revolutionary and challenges existing standards, roles and experiences. Consensus should be an important and realistic goal, and actively pursued. Decisive action and reasonable risk taking, however, will result in the attainment of the vision of Minnesota as the acknowledged leader in the use of information technology for the benefit of all its citizens by the year 2000.

With this in mind, it is the Working Group's recommendation that Minnesota, through public/private partnerships, establish several pilot projects. These pilots would be targeted toward breakthrough strategies to achieve conditions that put our knowledge base beyond current status. They would encompass waivers of law, rule and regulation; they would also call on private sector interests in the technology and telecommunications industry to partner with stakeholders in endeavors that hold public purpose, such as the ideals of equity and universal service.

Such an effort would demand visionary leadership, a significant financial investment, willingness to accept risk in allowing the waiver of current restrictions within a defined scope, and a definite time period for demonstration. The time line of two years or less may seem short for measurable results, but considering the speed at which the technological environment is changing, the window of opportunity is imminent.

Although many unique interests are represented in the Information Infrastructure Working Group, there is an even larger interest group that is needed in future planning and implementation strategies. There are a number of issues that this Group must resolve to agree to disagree on; the platform of recommendations that is offered represents a plan that would carry this state forward by focusing on the urgent and collective priorities. We appreciate the opportunity to submit a pathway to the vision.

Appendix 1: Information Infrastructure Map - A Comprehensive Model

The attached diagram identifies the elements of an information infrastructure plan that describes major components and elements to consider while implementing a plan.

Our vision, *By the year 2000 - Minnesota will be the Acknowledged Leader in the Use of Information Technologies for the Benefit of All of its Citizens*, is prominent. The four subdivisions of activity, **Electronic Commerce and Economic Development, Education and Lifelong Learning, Health and Health care -- Emergency Services, and Government Information and Services** are identified, along with the four subheadings of recommendations, **Applications, Content, Training and People, and Physical Infrastructure**.

Universal themes of privacy, equity and cooperation are portrayed as the bottom line of the model, highlighting the importance of resolution of issues in these areas to accomplishing the goal.

A Comprehensive Model

**Minnesota's Commitment
to Leadership**

**By the Year 2000 - - Minnesota Will Be the
Acknowledged Leader in the Use of Information
Technologies for the Benefit of All of its Citizens.**

Cooperation

Equity

Privacy

1) Electronic Commerce &
Economic Development

2) Education &
Lifelong Learning

3) Health and Healthcare

4) Government Information
and Government Services

Applications

Content

Training & People

Physical Infrastructure

Privacy, Security, and Intellectual Property

Universal Service

Roles and Responsibilities

Benefits to All Citizens

This Framework Drives Comprehensive Action.

Appendix 2: Obstacles and Barriers

This section identifies some of the challenges that are recognized by the Information Infrastructure Working Group as present in our current reality. They are secondary to the importance of the goals that we can work cooperatively toward, but should be acknowledged in a pragmatic approach to an information infrastructure. Strategies to meet these issues can be developed through next step experiments.

OBSTACLES AND BARRIERS CLUSTERS

A. ROLES

Roles:

- ▶ Need for compliance with national goals
- ▶ Conflicting opinions on role of government
- ▶ Public vs. private role must be agreed upon
- ▶ Different perspectives of roles and responsibility: government, providers/business, communities

Government as Buyer:

- ▶ Budget constraints override optimization
- ▶ Budgeting and financial systems that support government
- ▶ Financing of infrastructure for educational institutions

Government as Regulator:

- ▶ Multiple LATAs in Minnesota
- ▶ Obsolete regulatory framework structure
- ▶ Being in transition from regulation to competition
- ▶ Telecom Act has drawn significant attention while adding confusion
- ▶ Effects of new Telecom Act

Government as Catalyst:

- ▶ Economic development model to serve users, transmission provider and content providers
- ▶ Mechanisms to support and facilitate a "community" approach to building infrastructure
- ▶ Minnesota's tax climate discourages business development and expansion

B. RESOURCES

Private Investment:

- ▶ Demand for large bandwidth service
- ▶ High costs for broadband services
- ▶ Lack of volume, particularly for high speed or high bandwidth services
- ▶ Speed/bandwidth of publicly available telecommunications network not adequate to meet today's needs

Economic Resources:

- ▶ High risk/uncertain reward
- ▶ Lack of statistical data
- ▶ Disincentive to industry/lack of clear strategy
- ▶ Investment policies encourage conversion to digital technologies from analog

C. TECHNOLOGY

Technical Services:

- ▶ Lack of standards, particularly in most advanced technologies
- ▶ Lack of standardized protocols
- ▶ Lack of standards that ensure interconnectivity of various systems
- ▶ Lack of coordination
- ▶ Lack of clarity around the role and extent of government
- ▶ No boundaries as to the extent of government responsibility
- ▶ Lack of a plan and vision with understandable roles and principles of interaction

Demographic Challenge:

- ▶ Local phone access to Internet
- ▶ Much of Minnesota is remote
- ▶ Multiple small phone service providers
- ▶ Rural cost to provide access
- ▶ High cost of access (until recent legislation)
- ▶ Provider fragmentation of state and communities

Pace of Technology Change:

- ▶ Rapid obsolescence of information technology
- ▶ Evolving technologies

D. CITIZEN EDUCATION AND ATTITUDE:

- ▶ Resistance to change or reengineering (minimizing technological advantages)
- ▶ Citizen acceptance
- ▶ Relevant information on technical education
- ▶ Lack of education and training in technical and technology issues
- ▶ Overcoming cynicism due to failed efforts
- ▶ Technology tools and knowledge not available to all citizens
- ▶ Lack of training in using telecommunication tools
- ▶ Policy makers lacking technical appreciation
- ▶ Resistance to understanding the technical and economic issues

Appendix 3: Sources and Resources

A Nation of Opportunity, Realizing the Promise of the Information Superhighway

United States Advisory Council on the National Information Infrastructure, January 1996

(Can be accessed on the web @ <http://www.westpub.com/acnii>)

A Shared Vision for Minnesota

Minnesota Rural Telecommunications Task Force Report, July-September 1995

The State-Federal Partnership Technology Partnership Task Force Final Report

In collaboration with Carnegie Commission on Science, Technology and Government, National Governor's Association, American Society of Mechanical Engineers, The White House Office of Science and Technology Policy and the National Conference of State Legislatures, September 5, 1995

Government Information Access Council Principles

Adopted January 26, 1996

Integrating the Telecomm Pieces

Ronald Choura, 8th Annual Minnesota Telecommunications Conference for State Agencies, Local Governments, Education and Libraries, May 21, 1996

Telecommunication and Information Technology, Who's Doing What in Minnesota

League of Women Voters in Minnesota, March 13, 1996

Appendix 4: Government Information Access Council Principles

The Government Information Access Council (GIAC) was created by the Minnesota Legislature in 1994, and has a two-fold mission: to improve public access to government information and services in order to help citizens become more involved in the democratic process, and to help government become more efficient, effective and responsive to the public through the use of information technology. The 29-member council is charged with providing leadership and developing guidelines from a citizen-focused perspective on how government information and services can be provided and accessed through a statewide, coordinated electronic method. The council members represent state government, other public sector organizations, educational institutions, libraries, local government, business and citizens. Formed in response to the growing public demand for state agencies to offer more easily accessible information and services, GIAC provides oversight to avoid wasting resources and duplication of efforts by agencies. It provides a statewide, coordinated electronic method of accessing government-held information. GIAC created *North Star*, the state's first informational website on the Internet.

Appendix 4 includes the GIAC principles and some further detail on their meaning.

Government Information Access Council

Principles as Adopted 1/26/96

1. *Access to government information is a fundamental right of all citizens in a democracy.*
2. *Responsive provision of information access and the dissemination of government information are essential functions of government.*
3. *Public access to government information shall be free, and any charge for copies shall not exceed marginal cost.*
4. *All citizens, regardless of geographic, physical, cultural, socio-economic status or other barriers shall have equitable and affordable access to government information.*
5. *The Minnesota Government Data Practices Act and other information access policy laws must be complied with and enforced at all levels of government.*
6. *Privacy is a right that must be maintained and protected in the context of changing technology.*
7. *Government information shall exist in the public domain to the greatest extent possible.*
8. *Government shall ensure that government employees and citizens have the tools, applications, training, and support for electronic access.*
9. *Interaction among citizens, governments, businesses and organizations shall be promoted through the use of information technology and networks.*
10. *Citizens shall be enabled and encouraged to be consumers and producers of electronic information and services.*
11. *The state shall ensure that all citizens of Minnesota have the benefits of Universal Service.*
12. *Effective competition in telecommunications services in Minnesota is an essential component of effective access and interactive use of government information and services in electronic form.*

Government Information Access Council
FINAL PRINCIPLES
Adopted 1/26/96

1. Access to government information¹ is a fundamental right of all citizens in a democracy.

- 1.1 Citizens can more effectively contribute to democratic, economic and social progress when they can access and use public information without restraint.
- 1.2 Basic access rights include the equal and timely right to free inspection, to receive copies, and to access and use government information in all forms and media for any legal purpose.
- 1.3 All Minnesota government data should be presumed to be public unless otherwise classified by statute.

2. Responsive provision of information access and the dissemination of government information are essential functions of government.

- 2.1 Creating, disseminating and providing access to information is a mission of government units and such activities should be funded by public dollars just as are any other essential government functions.
 - 2.2 Government has a duty to collect and disseminate information to further its public purpose only, not for its economic gain.
 - 2.3 To achieve convenient and cost-effective public access, intergovernmental coordination and organization of information - from creation to preservation - is essential.
 - 2.4 Government units shall support the essential functions of citizen assistance and education, and provision of information locator tools.
- 2.5 Government shall acknowledge the "Tools of Democracy"² as essential for

1

"Government information", used as a term throughout GIAC documents, means Government data and as such can be used interchangeably. The statutory definition of Government data is: "Government data" means all data collected, created, received, maintained or disseminated by any state agency, political subdivision, or statewide system regardless of its physical form, storage media or conditions of use.

2

"Tools of Democracy" is the term used for "those government information and

citizens to actively participate in and understand government, and shall make those "tools" available in various media, including electronically, at no cost to the user.

3. *Public access to government information shall be free, and any charge for copies shall not exceed marginal cost.*³

3.1 Inspection of public data in all media must be available free of charge. Copies shall be available for duplication or electronic transmission for free, or at a cost not to exceed the marginal cost of dissemination.

3.2 Recovery of development costs or generation of revenue from information created or collected with public funds shall not occur without specific statutory authorization.

4. *All citizens, regardless of geographic, physical, cultural, socio-economic status or other barriers, shall have equitable and affordable access to government information.*

4.1 Geographic and economic barriers to access shall be eliminated by making tax incentives and funding mechanisms available to citizens, government jurisdictions, private businesses and especially providers of content, connectivity and site access for linked community-business networks.

4.2 Barriers to information access shall be eliminated in accordance with the Americans with Disabilities Act of 1990 (ADA).

4.3 Government information access barriers which are based on language and culture shall be eliminated by implementing, in accordance with federal and state laws, multilingual and multicultural components.

4.4 The state shall ensure equitable and affordable access to government information through a variety of public-private funding mechanisms including tax incentives, low-interest loans, public appropriations, private foundations and charitable contributions.

5. *The Minnesota Government Data Practices Act and other information access policy laws must be complied with and enforced at all levels of government.*

data whose access is essential to allow citizens to participate fully in a democratic system of government." [MN.STAT. 15.95, Sec. 1, Subd. 7]

3

"Marginal cost" means charges to recover the cost for copies of information and data are limited to the costs for materials and supplies or electronic transmission, but excludes labor, overhead and development costs.

- 5.1 Training of government personnel and citizen education regarding the rights granted under access and privacy laws is essential for compliance with those laws.
- 5.2 Additional non-litigious mechanisms for effective enforcement of the Minnesota government Data Practices Act and other access laws shall be developed and implemented.
- 6. *Privacy is a right that must be maintained and protected in the context of changing technology.*
 - 6.1 The public's right to know should be balanced with individuals', businesses' and organizations' right to privacy.
 - 6.2 Users of government information shall have a protectable privacy interest.
- 7. *Government information shall exist in the public domain to the greatest extent possible.*
 - 7.1 Stewardship of government information, and the value of that information, is a function of government.
 - 7.2 Government shall protect the right of citizens to use public government information for any legal purpose and shall promote the use of public government information to meet public purposes.
 - 7.3 Use of government information should not be constrained by copyright or copyright-like controls except under limited circumstances.
 - 7.4 A government unit may exercise copyright on certain government information pursuant to criteria established by the legislature.
 - 7.5 In no case should government's exercise of copyright be used to deny public access for inspection or to receive copies of public government information.
- 8. *Government shall ensure that government employees and citizens have the tools, applications, training, and support for electronic access.*

- 8.1 The state shall provide training to government personnel across all levels of government on information access and service technologies, applications, and policies which shall be supported by additional state appropriations.
- 8.2 The state shall establish a variety of outreach and public relations programs statewide to educate and inform citizens on the value and use of emerging information access and service technologies used by the state.
- 8.3 The state shall provide support to citizens who require assistance accessing government information and services electronically on a twenty-four hours per day, seven days per week basis.

9. *Interaction among citizens, governments, businesses and organizations shall be promoted through the use of information technology and networks.*

- 9.1 Government shall accelerate the provision of its services through technology and networks which encourage electronic interaction among citizens, businesses and organizations.
- 9.2 Publicly supported statewide electronic access to government information and services through multiple technologies and public access points is essential for information dissemination and efficient delivery of government services.
- 9.3 A diversity of information sources in the public, private and non-profit sectors should be encouraged to provide the public with access to government information resources.
- 9.4 The state shall establish time tables for state wide electronic public access to government information and services.
- 9.5 Government shall support public and private on-line efforts to ensure the development of online public spaces for discussion of public issues, civic participation, and problem-solving.
- 9.6 Government shall increase its use of electronic communication infrastructures and promote their use in the professional work of government staff.
- 9.7 Demonstration projects and outreach efforts shall be promoted and/or developed by government at all levels.

9.8 Government shall base its investment in the development and provision of electronic services on the long-term economic and social benefits of those investments.

10. *Citizens shall be enabled and encouraged to be consumers and producers of electronic information and services.*

10.1 State policies should encourage symmetry in the access and dissemination of information.

10.2 State policies shall support individual and community economic vitality through effective and efficient electronic information and services.

10.3 The State shall provide libraries, individuals, educational institutions, non-profits and businesses with tax incentives or other financial assistance to acquire and use equipment, applications, content, infrastructure, training and other tools to stimulate demand for electronic access to government information and services.

10.4 The State should provide libraries and public and private educational institutions with ongoing financial assistance for recurring costs of electronic access to government information and services.

11. *The state shall ensure that all citizens of Minnesota have the benefits of Universal Service.*⁴

11.1 The Legislature and Administration shall periodically define the specific products, services and infrastructure requirements which constitute Universal Service.

11.2 The State shall establish a fund designed to provide Universal Service. Support for such Universal Service Fund should be equitably assessed on all providers of telecommunications services.⁵

4

"Universal Service" means access to those electronic communications services, without regard for economic or geographic barriers, necessary for individuals, businesses and communities to survive and thrive, particularly with respects to access to education, health care, business, culture and community, and government information.

5

"Telecommunications Services" means those services for the two-way, interactive transfer of information by electronic means, including such technologies as

12. *Effective competition in telecommunications services⁶ in Minnesota is an essential component of effective access and interactive use of government information and services in electronic form.*

- 12.1 The State shall continue to adapt its methods and jurisdiction for regulating providers of telecommunications services towards the point where effective competition in telecommunications services ensures reasonable cost telecommunications services throughout the State, and ensures development of telecommunications infrastructure throughout the State.
- 12.2 Until such time as there is effective competition in telecommunications services throughout the State, the State shall have the legal power and the practical ability to intercede in the market, so as to avoid or prevent pricing disparities among groups of customers and/or regions of the State and to ensure development of the telecommunications infrastructure throughout the State.
- 12.3 At such time as there is effective competition in telecommunications services throughout the State, the State's oversight of the telecommunications services market shall be limited to the extent necessary to ensure Universal Service, interoperability of telecommunications systems, and consumer protection as is provided in other competitive markets.
- 12.4 The State shall create a formal mechanism to coordinate policy formation and oversight with respect to appropriations, regulatory, and tax policy to ensure continuity and consistency among federal, state and local policies which affect telecommunications services.

traditional telephony, wireless, cable, and computers.

6

"Effective competition in telecommunications services" is a condition where there are generally available in all populated locations throughout the state many providers of telecommunications services, and where there is organized and open transfer of information about the providers to the buyers.

Appendix 5: Information Infrastructure Working Group Members' Biographies

Rick Berglund

Rick Berglund is an executive of Ceridian Corporation, where his responsibilities have included corporate investor relations as well as strategic planning and corporate development for the company's Computing Devices International division. He is currently leading a group of technology-oriented "start-ups" within Computing Devices. Mr. Berglund is a graduate of Carlton College (BA, '81) and the Carlson School of Management (MBA, '89). He and his wife, Darcy, are the parents of two young boys; the older of the two attends kindergarten in the Minneapolis public school system.

Mr. Berglund is on the Board of Directors of the Minnesota High Technology Council and Rebuild Resources, a "back to basics" work skills training program for recovering, drug dependent young adults. He has an avid interest in the application of technology toward the improvement of quality of life and, although not a native of Minnesota, considers himself one of the true believers.

Erin Binder

Erin Binder is an executive of QuikPage, an Internet Web Page advertising start-up which incorporated in April 1996. During the majority of her time on the Information Infrastructure Working Group, Ms. Binder was responsible for program development at 3M's National Media Laboratory (NML). NML is the industry resource for federal government programs in recording and advanced information technologies. In this position, Ms. Binder was responsible for technology transfer, Congressional briefings on the status of industry technologies, systems architecture and University Research programs. Ms. Binder is a graduate of Washington University in St. Louis (BSEE '83).

Ms. Binder is on the Board of Directors of the Minnesota High Technology Council, a member of the Minnesota Internet Software Technology Association, and a volunteer with the Guardian Ad Litem Program in Washington County. She is married to Mark Binder and they live in Afton with their two children and enjoy boating, skiing and new adventures.

Rick Berglund

Rick Berglund is an executive of Ceridian Corporation, where his responsibilities have included corporate investor relations as well as strategic planning and corporate development for the company's Computing Devices International division. He is currently leading a group of technology-oriented "start-ups" within Computing Devices. Mr. Berglund is a graduate of Carlton College (BA, '81) and the Carlson School of Management (MBA, '89). He and his wife, Darcy, are the parents of two young boys; the older of the two attends kindergarten in the Minneapolis public school system.

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Representative Fran Bradley

Elected to the House of Representatives in 1994, Mr. Bradley is his first term in the Legislature. His committee participation includes the Select Committee on Technology, Health and Human Services, Commerce, Minnesota Care Finance and Transportation and Transit. He has a BS in Mechanical Engineering from South Dakota State University and graduate work at the University of Minnesota..

He and his wife Mary have four children, and they reside in Rochester, Minnesota, where he is retired from IBM as a computer engineer and manager.

Debra K. Deegan

Debra is a government relations counsel at West Publishing. She provides staff support to the President of West, Vance K. Opperman, for a number of Councils, including the National Information Infrastructure Advisory Council and the Government Information Access Council.

Debra joined West Publishing in 1993 as an Editor, where her responsibilities included editing *The Law Office Series*. These publications focus on teaching attorneys how to use technology in the practice of law. Debra received her BBA cum laude in computer information systems from Southwest Texas State University in 1986, and Juris Doctor from William Mitchell College of Law in 1993.

Elaine S. Hansen

Elaine Hansen, appointed by Governor Carlson as the commissioner of administration for the State of Minnesota in January of 1995, has the oversight and leadership responsibility for many of the general business functions of the State, including the core computer operations and telecommunications through InterTech, and the Information Policy Office. Prior to her appointment as commissioner, she served as director of finance for the city of Duluth, was employed by Minnesota Technology, Inc. as treasurer, and was both staff auditor and director of audits at the Office of the State Auditor, State of Minnesota.

Ms. Hansen is a certified public accountant with a BA from the University of Minnesota-Duluth, and is a graduate of Williams College Executive Program in Williamstown, Massachusetts. Ms. Hansen represents the State of Minnesota on numerous boards and councils that are planning for information infrastructure advancements. She belongs to many professional organizations and is a member of the Board of Directors for the Minnesota Society of Certified Public Accountants.

Richard C. Hawley

Dick Hawley managed manufacturing and product development for approximately 17 years with manufacturing experiences ranging from foundry and molding to chemical etching and product contact from motorcycles to telecommunications. His executive and management responsibilities typically included all the computerized systems for manufacturing, from standard costing systems to CAD/CAM. He has been involved with numerous telecommunications developments such as Northern Telecom's Displayphone, Metropolitan Area Network, broadband fiber optic networks, integrated voice response systems, network based transaction processing, wireless air-to-ground connections, network management, and the introduction of frame relay services. He has a degree in mechanical engineering from the University of Minnesota.

Mr. Hawley is presently an independent telecommunications consultant, having founded Introspect in 1992. Introspect focuses on moving large volumes of data, video and voice traffic using digital networks. He has recently formed iMEDge, LLC., a medical imaging company that will concentrate on interactive medical graphics and engineering. He is on the Board of the Minnesota High Technology Council, and has served on the Government Information Access Council and the Minnesota Department of Education Information Technology Task Force. A self-described technology evangelist, he emphasizes systemic change management, noting that sociological and humanistic changes need to keep pace with technology to successfully harness and optimize the full potential of the new "digital paradigms."

Paul Hoff

Paul Hoff has served as general manager/chief executive officer of Park Region Telephone Company in Underwood, Minnesota, for the past 18 years. Previous management experience includes 10 years with Northwestern Bell Telephone Company.

Mr. Hoff is past president of the Minnesota Telephone Association and has served as director of the Association of Minnesota Telephone Utilities. Hoff continues to represent the industry on state government committees under the appointments of the last two governors. Mr. Hoff is chairman of the Board of Minnesota Equal Access Network Services (MEANS) and president of the West Central Transport Group, LLC. Other current industry boards include Hector Communications Corporation, North Central Utilities (Otter Tail Power Company), and Midwest Minnesota DBS. He has served on other boards including a long distance company, cellular, paging and numerous community development entities.

Jean B. Keffeler

Jean Keffeler is an independent consultant providing management advisory services to business and government. Immediately prior to establishing her consulting practice, she was the senior executive officer of the West Region of Health One Corporation. Her business experience also includes executive positions in marketing and finance at Control Data Corporation and Northwestern Bell. An extensive career in government precedes her involvement in the corporate sector.

Jean Keffeler is the immediate past chair of the Board of Regents of the University of Minnesota and she was recently reelected unanimously by the Minnesota Legislature to a second six-year term on the Board of Regents. She has served on numerous public and non-profit boards and commissions. Ms. Keffeler graduated with high honors from the University of Minnesota and holds graduate degrees in Public Administration and Social Work from the University of Minnesota and an honorary doctorate from Drexel University. She is married to David Stanley, is an avid gardener, photographer and long-distance cyclist, and has two daughters.

David H. Kelley

David H. Kelley has held the position of president/chief executive officer of Minnesota Equal Access Network Services, Inc. (MEANS) and its subsidiaries since October 1, 1989. Prior to joining MEANS, Mr. Kelley served from 1987 to 1989 as Vice President, International for National Computer Systems where, as division head, he was responsible for all International Business. From 1984 to 1987, Mr. Kelley was a general manager for International Marketing with AT&T where he had responsibility for developing and implementing an extensive marketing plan in Japan. This international marketing effort involved the establishment of direct sales channels, distribution agreements, and joint business relations with Japanese partners. Mr. Kelley also developed worldwide business opportunities for AT&T from 1981 to 1983. Prior to this, he held various positions with Mountain Bell from 1971 to 1980, which provided him substantial experience in operations, planning, project management, engineering and construction.

Mr. Kelley is a graduate of the United States Military Academy at West Point and a decorated Viet Nam veteran. He and his wife, Jean, are residents of Eden Prairie, Minnesota.

Stephen P. Kelley

Elected to the Minnesota House of Representatives in 1992, Mr. Kelley is an attorney specializing in commercial litigation with the firm of Mackall, Crounse & Moore, PLC, in Minneapolis. He received his BA, cum laude, from Williams College in Massachusetts, and his law degree from Columbia University School of Law. He has been very active in the Citizens League, acting as director and chair of the Program Committee, which included work on committees studying the Minnesota economy, the University of Minnesota, telecommunications policy, and the Minnesota caucus system. He has served as chair of the Board of Fastens Health Choice, a preferred provider organization, and director and board chair of Physicians Health Choice, as well as numerous other health care related boards.

Mr. Kelley considers his major legislative accomplishments to be his work on state telecommunications and information policy, and obtaining a consensus on how to modify the sunset provision on school district levies. He is married to Sophie Bell Kelley and they live in Hopkins with their two children.

Rick Krueger

Rick Krueger is the president of the Minnesota High Technology Council, a trade association committed to making Minnesota the best state in the nation for technology-based business. Mr. Krueger was a state representative from 1983 until 1994, where he served as the chair of the State Government Finance Committee, Speaker Pro Tempore and Assistant Majority Leader. He served six terms of office and previously chaired the Committee on International Trade and Technology. He was an information technology consultant and previously owned a small computer networking company.

Mr. Krueger has received Medical Alley's Meritorious Service Award for his work on behalf of the biotechnology community, and was recognized by the American Electronic Association as one of the top legislators in the nation for promoting technology, and serves on several boards and committees. He received his BA from Winona State University, a Masters of Arts in Teaching from the College of St. Thomas, and a Masters in Public Administration from the Kennedy School of Government at Harvard University. He is a doctoral candidate at the University of Minnesota in Educational Administration.

Mary Leonard

Mary Leonard is the national marketing manager for the State Government and University Systems organization of MCI Telecommunications. In this role Ms. Leonard represents MCI to the states of Minnesota, North Dakota, South Dakota and Montana. She actively participates in formulating telecommunications solutions to meet the specific needs of government. In Minnesota, Ms. Leonard is responsible for the overall management of MCI's contracts with the State of Minnesota for MNet and the Department of Corrections. In addition to her responsibilities in Minnesota, she provides subscriber-based Internet in the state of Montana. Prior to joining MCI in 1994, Ms. Leonard was the assistant director of telecommunications for the State of Minnesota.

Ms. Leonard has a BA and a BS from the University of Minnesota, is a lifelong resident of St. Paul, and represents MCI on the Minnesota High Technology Council.

Jake Manahan

Jake Manahan has served as deputy state treasurer for the State of Minnesota since his appointment in January 1987. In October 1991, he was elected chair of the Information Policy Council (IPC) for Minnesota state government; he was reelected to another four-year term in June 1995. The IPC is the state government entity responsible for developing information principles which are the basis of the information policies, standards and guidelines ultimately adopted by the Information Policy Office of the Department of Administration. Each state agency appoints one management-level representative to the Council. IPC is also the umbrella organization for numerous information projects, initiatives and workgroups within state government.

Mr. Manahan is a graduate of St. Mary's College in Winona, Minnesota and of the Law School at the University of Minnesota. Prior to his appointment as deputy state treasurer, he was in private law practice for 13 years.

Jay Novak

Jay Novak was named commissioner of the Minnesota Department of Trade and Economic Development (DTED) by Governor Arne H. Carlson in July 1995. DTED is responsible for directing the state's efforts in business development and job creation. The department includes three divisions: the Business and Community Development Division, which works with both businesses and communities in Minnesota to help businesses grow and expand; the Minnesota Trade Office, which provides resources and assistance to Minnesota companies engaged in exporting products and services; and the Minnesota Office of Tourism, which supports tourism and tourism-related businesses.

Commissioner Novak was editor of *Twin Cities Business Monthly*, a 39,000-circulation magazine launched in 1993. Earlier, he was communications director at General Mills, a Fortune 500 company. He has been associate publisher and editor of *Corporate Report Minnesota*, a regional business magazine, editor of *City Business*, a weekly business magazine, and editor of a weekly magazine for midwestern bankers. Mr. Novak began his career as a reporter for the *Worthington Daily Globe*. Commissioner Novak has taught journalism at Worthington Community College and taught technical writing at several technical colleges. He has a BA in journalism from the University of Wisconsin, and an MA degree in Mass Communications from the University of Minnesota.

Randall D. Young

Randy Young is manager of government relations and accounts for Minnesota Equal Access Network Services (MEANS), a centralized equal access provider owned by 57 of the rural telephone companies in Minnesota. He is also responsible for the development of economic development programs, working with independent telephone companies and rural communities. Prior to joining MEANS in 1993, Mr. Young was the director of telecommunications policy planning for the State of Minnesota for seven years. In this capacity, he chaired the Governor's Interagency Task Force on Telecommunications Regulation whose report led to the 1987 Telecommunications Regulatory Reform Act and the Minnesota Public Utilities Commission's intraLATA Equal Access Study Group which recommended the nation's first plan for implementing 1+ intraLATA equal access dialing. He was also heavily involved in the creation of STARS, the state's new telecommunications network. Randy has also served as the staff director and executive secretary of the Minnesota Public Utilities Commission for over five years.

Mr. Young serves on the Government Information Access Council, the Executive Board of the Minnesota High Technology Council, and the Board of Directors of Telecommuters Resources, Inc. He holds a BA degree in political science from North Park College in Chicago, and an MA in public administration from Mankato State University. He is on the adjunct faculty in the Telecommunications Management program at St. Mary's University.