Beacon to Our Future

Developing a Master Plan for Information Technology in Minnesota

Phase One

Minnesota Office of Technology
April16, 1998

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Per the requirements of Minnesota Statutes Chapter 3.197, the cost of preparing and printing this report is estimated to be: $3,500 for staff time and printing.

This information can be made available in an alternative format such as Braille, large print, audio tape or computer diskette. It is also available at our web site at http://www.ot.state.mn.us. For TDD communication, contact the Minnesota Relay Service at 612-282-5353 or 1-800-627-3529 and ask them to place a call to the Office of Technology at 612-215-3878.

Executive Summary

Technology is changing every aspect of our lives. Innovations in information and communication technologies are rapidly and profoundly transforming the way we work, learn, play, locate, do business, govern and communicate. To reap the maximum benefits of the digital global society of the 21st century, Minnesota will need to achieve a common vision. This common vision grows from a commitment to meeting the needs for a well-educated populace, a thriving economy, and a responsive public sector. The vision is:

> Minnesota citizens, businesses and governments will have the opportunity to use information and communication technologies to improve every facet of our society – our homes, our businesses, our schools and our communities.

Governor Arne H. Carlson and the State Legislature have charged the Minnesota Office of Technology to provide statewide leadership and direction for information and communication technologies.[1] While the Office of Technology is responsible for drafting this statewide plan, the role of the Office is that of policy navigation, not implementation. Operational responsibilities are shared by the many state agencies, private companies and government institutions of our state. This plan seeks to reflect that shared responsibility.

The groundwork for a successful future has already been laid, with significant state investments in technology. Since 1991, the Carlson Administration has appropriated more than $2 billion for technology. Additionally, effective partnerships have been built among the public, private and nonprofit sectors to help Minnesota establish its place as a digital technology leader of the next millennium.

This document represents the first phase of the state's Master Plan. Subsequent phases will involve input through various structured and facilitated forums with public and private stakeholders. At the end of this effort there will be a mechanism for the entire state that will propel Minnesota into the next century.

This document describes the five goals and their supporting strategies that will be employed to realize our shared vision. These goals – as determined by the Office of Technology in Phase One of the Master Plan development – are:

- Technically Literate and Competent Society
- Efficient and Effective Government
- Easy and Affordable Access
- Stimulated Economic Development

[1] Minn. Stat. Ch. 16E.o3, Subd. 2: "The Executive Director shall coordinate the design of a master plan for information and communications technology systems in the state and its political subdivisions and shall report on the plan to the governor and the legislature at the beginning of each regular session."

- Improved Quality of Life

The section of this report entitled "At a Glance" provides a summary of the goals and their strategies (page 5).

Phase One of the Master Plan also describes the current status of information and communications technology in the state, as determined in an initial assessment by the Office of Technology (page XX). It is anticipated that stakeholders will add to this information in subsequent phases. Included with the status is a list of projects and programs that are underway to implement the strategies necessary to achieve the state's goals (page XX). As with the status data, input from stakeholders will enhance this area.

Master Plan At A Glance

Vision				
Minnesota citizens, businesses and governments will have the opportunity to use information and communications technologies to improve every facet of our society – our homes, our businesses, our schools and our whole communities.				
Goals				
Technically Literate and Competent Society	Efficient and Effective Government	Easy and Affordable Access	Stimulated Economic Development	Improved Quality of Life
Strategies				
Competency standards for new and current educators	Leverage resources within and across organizations to improve government products/services	Expand technology infrastructure	Restructure legal and regulatory framework	Restructure legal and regulatory frameworks
Competency standards for students	Improve service delivery using technology	Improve consistency, security and reliability of technology infrastructure	Expand consumer use of technologies for commerce	Expand electronic health care capabilities
Lifelong learning for all Minnesotans	Achieve quality through continuous process improvement	Stimulate competition	Develop technical standards and protocols	Use technology to increase access to arts and cultural experiences
Promotion of technical literacy	Achieve consistency through common policies, standards and guidelines	Ensure universal access	Promote electronic commerce	Improve environmental and natural resource stewardship
Awareness of emerging technologies and trends	Measure progress to achieve efficiency and quality strategies	Ensure technology solutions are interoperable, scaleable, portable and interconnect with other technology solutions		Integrate technology into Minnesota's transportation system
Uniform course equivalency for virtual course work	Use technology to support business goals and outcomes	Restructure legal and regulatory framework		Expand access to community organizations
Create and maintain a technically competent workforce	Effectively manage information resources			Integrating technology in personal life planning & activities
	Restructure legal and regulatory framework			

Guide to Understanding This Document

This document is organized in two sections. The first part describes the overall goals that Minnesota must meet to realize the vision for information and communication technology in the state. For each goal, several strategies describe the means by which the state could meet these goals. Specific tactics or projects provide additional detail on how these strategies would be implemented. It is at the tactic level that one would locate legislatively funded initiatives, agency activities and efforts, and public or private sector partnerships and programs.

The second part of the plan details the way progress in reaching the state's vision will be measured over time. This status report is an assessment of the programs, state expenditures and measures that describe Minnesota current use of information and communication technologies. By defining Minnesota's efforts and collecting data for each subsequent report on the Master Plan, we can demonstrate the progress Minnesota has made toward the vision.

Because this plan is the first effort to measure the state's information and communication technologies, not all of the data necessary to completely describe the state's efforts may be reported here. In upcoming phases of the plan's development, the office will work with public and private stakeholders to develop this section of the Master Plan. In addition, the office expects the availability of data about information and communication technology in the state to expand over time.

The appendices of this document provide detail that support the status section of the report. In-depth descriptions of each program or project described in the tactics section are not included because it would make the report far too voluminous and difficult to keep current. Additional information may be found on the Office of Technology's web site, www.ot.state.mn.us, or requested by calling the office at 612-296-3778.

Introduction

The Master Plan for information technology for the State of Minnesota must provide tools for meeting key social needs. Much of the work of the state agencies and the most recent state budgetary decisions have been focused on the belief that it is the state's responsibility as a whole to boost the health and wellbeing of it's people. In this light, the Master Plan will address three key social needs:

- a well-educated populace;
- a thriving economy; and
- a responsive public sector.

When properly integrated into the social fabric, information technology is a powerful tool or resource for achieving solutions to each of these needs.

Essential components of the integration of technology are people, processes and platform. To have a successfully operating information technology system, all portions of the system must be developed in a coordinated and integrated manner. We must have a populace, which possesses basic skills and is also technologically trained and literate – the people component. We must have standards and rules for the inter-workings of people and equipment – the process component. Finally, we must have an inter-linked system of information technology resources – the platform component. To invest in any one of these components without including coordinated investments in the other two is to invest in a vacuum, and will lead to a dysfunctional system.

The plan proposed here focuses on meeting the described social needs for a well-educated populace, a thriving economy and a responsive public sector using the three basic components of people, process and platform. The goals and strategies address these components, particularly Goals 1 - 3. Goals 4 and 5 relate to specific outcomes of a successfully constructed and integrated information technology system, outcomes such as an enhanced economy, and an improved quality of life.

The Vision

Vision Statement

"Minnesota citizens, businesses and governments will have the opportunity to use information and communication technologies to improve every facet of our society – our homes, our businesses, our schools and our communities."

The Strategic Vision

Milestones in science and technology have marked the pathway of progress. Johann Gutenberg's creation of the printing press in the 15th century laid the foundation for universal literacy. Alexander Graham Bell revolutionized the 19th century with the invention of the telephone. And, ushering us out of the industrial age and into the knowledge age was Howard Aiken with the invention of the first general-purpose computer.

The next century will converge the knowledge age into the digital age. Imagine a time where geographical boundaries do not define a government; where currency as we know it becomes obsolete, and a signature on a loan becomes an encrypted code. This is a vision of the digital age and the time is tomorrow. How Minnesota citizens plan this time and optimize this digital future will define our successes as a community of learners, leaders and workers. The development of a plan to guide this future is critical to its success.

Goals, Strategies and Outcomes

In Phase One of this plan, the Office of Technology has identified five goals that will incorporate information and communication technologies into life in Minnesota. These goals are summarized as:

- Minnesota will have a technically literate and competent society
- Government will improve the efficiency and effectiveness of its products and services by using information and communication technologies
- Minnesota citizens will benefit from easy and affordable access to information and communication technologies
- Information and communication technologies will stimulate Minnesota's economic development
- Information and communication technologies will improve the quality of life in Minnesota

The following section describes the purpose of each goal and the strategies that have been identified as the means for accomplishing the goal.

Goal 1: Technically Literate and Competent Society

Minnesota will have a technically literate and competent society.

As information technology assumes a larger role in our lives, it will be necessary for every citizen to have a base level of technical competency or literacy to engage in daily activities that rely on technological processes, just as every citizen should possess competency in reading and writing. While reading and writing open a window to the world, technology can greatly enhance the variety of opportunity in the educational world.

Changing technology represents both a challenge and an opportunity for Minnesota. The knowledge and skills needed for employment and competitiveness require us to foster a culture of lifelong learning. To ensure that learners acquire the kinds of skills necessary to be successful employees in the workforce, technology must be integrated into daily classroom activity.

Beyond basic literacy, there is a need for a technically skilled workforce to develop, operate and maintain our technological environment. The demands on the workforce will grow as the environment becomes more sophisticated.

It is well known that Minnesota – and the country – is experiencing a shortage of information technology professionals in the workforce. The supply of work-ready professionals is insufficient to meet the demand and the needed skills are changing rapidly. This situation results in an extremely volatile job market.

Short-term relief for this situation involves retraining and upgrading the skills of the existing workforce. The United States Senate Judiciary Committee recently passed a bill allowing

software and computer companies to increase the number of visas for foreign workers from 65,000 to 95,000 available this year under a program called H1-B. That number will jump to 115,000 next year through 2002. This may bring relief to some Minnesota companies. Long-term solutions rely on Minnesota's educational systems to provide the future supply of technically competent workers.

The extreme volatility in this sector of the labor market, and rapidly changing skills needed, require a close, coordinated working relationship between the businesses and industries using information technology professionals and the institutions which educate and train students. Trends in job information and career development data should be examined to design educational programs that align learner outcomes with industry workforce needs.

Strategies

a. Competency standards for new and current educators

Teachers and faculty will become competent in using and integrating multimedia technologies as an accompaniment to traditional teaching methodologies.

b. Competency standards for students

Students and nontraditional learners will be capable of demonstrating multimedia technologies in presentation of learning skills.

c. Lifelong learning opportunities for all Minnesota residents

Opportunities will be available for all citizens to learn, renew and upgrade technology skills. Investments in public-private partnerships will expand access to lifelong learning through traditional and virtual delivery options.

d. Promotion of technical literacy

In addition to direct investments in K-12 institutions and lifelong learning opportunities, various events and activities such as the exhibits, conferences and special promotions (e.g., the "Wonders of Technology" at the Minnesota State Fair) can be used to dispel fears that technology is beyond the grasp of most citizens.

e. Awareness of emerging technologies and trends

f. Uniform course equivalency for virtual coursework

Work and family commitments take students around the globe and far away from Minnesota campuses. For many students, this makes completing a formal degree education in a classroom impractical. It is necessary to adopt changes to degree requirements that will allow students to use a greater amount of distance learning credits toward a degree.

g. Create and maintain a technically competent workforce

A project called Internet System for Education and Knowledge, or ISEEK, is one effort unique in the way databases have been linked to provide a "front door" for Minnesotans using the Internet to obtain employment opportunities, career planning and education

information. Students will be better informed about employment prospects and career opportunities and can use this information to select a field of study or seek employment.

Goal 2: Efficient and Effective Government

Government will improve the efficiency and effectiveness of its products and services by using information and communication technologies.

Government, like the private sector, must incorporate information technologies in its delivery of products and services to meet the large and growing demand to serving the public. Citizens want and are entitled to access to information, services and products in the most convenient and effective manner. Decisions must be made regarding appropriate technological solutions tailored to fit the needs of individual business functions of the specific agencies and jurisdictions.

It is the goal of the state to provide electronic and alternative ways to deliver services, transact business and provide information access to citizens, businesses and government partners, to respond to changing expectations. To achieve this goal, government needs to look at its laws and regulations. Without legal restructuring, state agencies will be hampered in their ability to streamline technologies that are designed to disseminate information and conduct transactions with external individuals and organizations.

Most affected by information and communication technologies are the laws and regulations that determine how government conducts its business. Specifically, laws regarding records retention and management, data practices (privacy), payment and receipt mechanisms, the legal status of electronic documents and signatures, authentication and security standards. As stated above, such restructuring must enhance government's ability to use information technology to conduct its business with no degradation of consumer and citizen protection.

Strategies

a. Leverage resources within and across organizations to improve government products and services

Information resources (data, applications and technology) should be shared and managed across traditional organizational boundaries. Agencies, information-resource communities and businesses should seek opportunities to develop cooperative relationships with one another in order to leverage all resources. This may require the establishment of funding strategies by which common, shared information resources can be developed, acquired and operated between and among these organizations. The strategy should be used to eliminate financial or political disincentives to sharing data, applications and technology.

b. Improve service delivery using technology

It is the goal of the state to provide an electronic, alternative means of delivering service, transacting business and providing information access to citizens, businesses and government partners – using a variety of technologies –to provide better service and respond to changing

expectations. It is the state's responsibility to seek opportunities for electronic delivery and eliminate any barriers to that delivery option.

c. Achieve quality through continuous process improvement

The challenge for state agencies is to provide consistent management of information resources through successful information technology projects and production of high quality products. To meet this challenge, a program of management and process improvement provides a unifying framework to achieve consistency across agencies. This framework would:

- establish a common base (methods, measurement criteria, etc.) for comparing activities or systems across organizations and projects;
- promote agencies as "learning organizations" through information technology process improvement and an ongoing strategy for continuous improvement;
- provide tools for making better funding decisions, ensuring acceptable levels of project success within agencies, and recognizing variations in agency capabilities when planning and implementing oversight activities;
- enable collaborative activities, based on shared principles, strategies and objectives; and
- build the capability and readiness of the information technology work force while making it possible to transfer skills across organizations and projects.

d. Achieve consistency through common policies, standards and guidelines

In managing state information resources – just as in managing state finances, personnel and buildings – the state must function as a community that needs and wants to cooperate for mutual benefit. Agencies need an information management infrastructure of policies, standards and guidelines that direct the strategic management of information resources and support the necessary linkages among state agencies and between state and local government. As the use of technology between government and citizens is expanded, there needs to be a standard protocol. For example, many uses of smart card technology and other point of sale capabilities are under consideration for making government more efficient and effective. It is important that a common set of standards and the delivery of this technology, so that vendors doing business with cardholders can rely on a single type of card reader.

e. Measure progress toward efficiency and quality strategies

In *Reinventing Government*, authors David Osborne and Ted Gaebler state "If you don't measure results, you can't tell success from failure". The state must develop a consistent view of what constitutes success in the development and use of information technologies to meet business needs. It is a goal of the state to deliver products and services to customers in the most efficient and effective manner possible. State government needs to determine how best to measure performance across all agencies based on the best practices of both the public and private sector.

f. Use technology to support business goals and outcomes

Information systems, like other important resources such as personnel and budget, are fundamental management responsibilities that should not be merely delegated to operations staff. An information system should reflect and support an organization's mission and functions. This linkage between information systems and organizational mission and functions is accomplished through an assessment called enterprise analysis. In enterprise analysis an agency formally defines what it does and matches information requirements to that charge. This can only be done when management assumes responsibility to make the linkage, develop plans for systems to produce the information, and effectively implement the plans.

g. Effectively manage information resources

Management of state government will be greatly enhanced with better management of its information. The gains will not only be in the efficiency of operation but also in taking fuller advantage of information when making critical decisions. This will be accomplished when we consider information as a state resource and cooperate toward a common direction for the state's information facilities, networks and data.

To that end, the state has developed general principles relating to information resource management practices and values. They represent a foundation of understanding and agreement. These principles assist agencies in accomplishing their legislatively mandated responsibilities while also contributing effectively to the collective needs of the state. The state will continue to review and build on these principles to address the rapidly changing information technology environment and the increased emphasis on technology solutions for business needs.

h. Restructure legal and regulatory framework

The legal and regulatory structures of our society set the rules and define the playing field for all forms of business, in both the private and public sectors, and create the framework for the full gamut of personal and social activities. Throughout history, advances in technology have required adjustments in law and regulation, sometimes creating whole bodies of law, such as maritime law, aeronautics law or radio communications law. Advances in information technology are no different and strategies related to the implementation of most, if not all of the goals of this plan will require restructuring the legal and regulatory framework. This recommendation is given with recognition that the restructuring should accommodate the use of new capabilities of information technology without compromising the protection afforded to all citizens and organizations by current law and regulation.

Most likely to need adjustments are the areas of regulatory law, consumer protection law, commercial contract law, tort claims or liability law, privacy law, and the laws and regulations which deal with the way government conducts its business.

Goal 3: Easy and Affordable Access

Minnesota citizens will benefit from easy and affordable access to information and communication technologies.

Information technology now provides access to an extremely broad spectrum of educational, business, commercial and personal interest data, information, services and transactions. Interest

in accessing this information will increase dramatically. People with access to information technologies today have a tremendous competitive advantage over those who have no access. This differential will only increase with time. Lack of access will become de facto disenfranchisement. It is, therefore, imperative that Minnesota provides universal access to all citizens.

Cooperation between the public and private sector – and a supportive regulatory environment in which private companies can expand access, introduce new services and create economic opportunities – will ensure that a privately developed and operated network of communication systems and services provides the capacity Minnesota citizens need.

Strategies

a. Expand technology infrastructure

Expanding local capacity through the development and operation of low cost, high quality, and broad bandwidth and open networks will provide affordable access to Minnesota businesses, schools and citizens.

The next generation global computing network known as Internet 2 under development at the University of Minnesota will allow data transmission at 622 million bits per second. This will allow Minnesota to become a hub in the vBNS, or "very high speed Backbone Network System." The vBNS began in 1995 as a fiber optic loop connecting the nation's five supercomputing centers. When developed, this will provide the speed and reliability researchers and some businesses require that is increasingly unavailable as the original Internet becomes more crowded. Minnesota needs to ensure that a plan is put in place to guide the expansion and access to other higher education facilities, state government and to the private sector.

The legislature has invested heavily in building infrastructure for various governmental entities. Yet, in researching this project it became apparent that the state lacks a comprehensive composite of what infrastructure is currently in place. A comprehensive mapping project would assist in identifying where gaps exist. The maps included as appendices to this document will be updated and coordinated with non-proprietary private sector information to ensure wise investments are made in the future as the facilitated stakeholder process proceeds.

b. Improve consistency, security and reliability of technology infrastructure

Quality of the infrastructure must be sufficient to ensure reliability regardless of capacity and meet the standards consistent with the Department of Public Service and Public Utilities Commission.

c. Stimulate competition

Regulatory structures should encourage bandwidth expansion to provide value-added networks and high speed digital services to residential and business customers through competitive, sustainable and consumer-driven markets. These markets should reflect quality, value, choice and fairness.

d. Ensure universal access

Impetus for universal access is fueled by the expectation that technology will reduce the economic divide of "haves" and "have-nots". Crafting effective policies may be the process by which people learn to use technology and integrate it into their daily lives.

e. Ensure technology solutions are interoperable, scaleable, portable and interconnect with other technology solutions

Universal standards must be adopted and integrated into the expansion of information technologies to prevent islands of incompatible service offerings. In an earlier computing generation, COBOL was to portability what Java is to portability and interconnectivity. We can expect to see more Java applications including a "Javagator" or Java based Netscape browser.

In addition, Sony and Microsoft have agreed to cooperate on a single standard so that the digital in-home network will allow interoperability of computers, digital television, video cameras and videocassette recorders. This will not only hasten the digital revolution, but also make consumers lives simpler.

Year 2000 looms as a technology issue impacting every aspect of our society. While state government works toward a solution for its systems the progress being made in the private sector and at other levels of government is unclear. Many large corporations are devoting significant resources to the effort. Despite media attention to the issue many smaller businesses may be caught short. One major Minnesota insurance company has a division that underwrites insurance policies to protect against Year 2000 failures. It is reasonable to recommend the State of Minnesota develop a coordinated contingency plan in the event major disruptions occur in delivery of essential goods and services within the state. This may include the State of Minnesota establishing a framework for Year 2000 to assist major industries in achieving compliance.

f. Restructure legal and regulatory framework

Current laws should be reviewed to ensure that access, quality, reliability, affordability and competition encourage market activity. The areas of law and regulation most likely to need restructuring for this goal are those which deal with regulation of the information marketplace. These laws and regulations should stimulate the expansion of information technology infrastructure while ensuring that the infrastructure – the "information highway"– is reliable, secure and consistent; allows interoperable, scaleable, and portable travel on the highway; and that the highway can interconnect with other technological resources and applications.

Goal 4: Stimulate Economic Development

Information and communication technologies will stimulate Minnesota's economic development

The diverse commercial and industrial bases of Minnesota's economy can be fortified by the competitive advantage available through enhanced information technologies.

Many areas of Minnesota have established thriving economies and diverse commercial and industrial bases. By providing competitive advantage through access to data, information, services and commercial transactions, information technologies will enhance existing ventures. Other areas of the state have fewer resources and more limited commercial and industrial opportunities. Information technologies can provide opportunities for far greater economic development by electronically facilitating business operations and professional practices in locations that could not support their existence physically.

Strategies

a. Restructure legal and regulatory framework

Electronic commerce requires a different social policy structure to determine when and to what extent liability risk ought to be created and imposed against the subject matter of a contract. The new and emerging bodies of law governing cyberspace extend beyond digital authentication, encryption and secured transactions. To stimulate the development of electronic commerce – and to make it a tool of commerce on equal footing with other tools – the state will be required to adopt a new section of the Uniform Commercial Code, section 2b. This will cover items such as, electronic contracts in multijurisdictional transactions, terms of records, performance, warranties, electronic regulation and remedies.

b. Expand consumer use of technologies for commerce

Consumer purchasing power will increase as a result of expanded opportunities of the Internet in much the same way the telephone increased service and product availability.

c. Develop and adopt technical standards and protocols

Standards and protocols should be developed that technologies will have to meet. As a result, when new technologies become available they will exclude the development of others.

d. Promote electronic commerce infrastructure development

State policy should be implemented that will build ubiquitous bandwidth and interconnect systems. Additional study of the significant emerging relationship between telework, Minnesota's workforce, transportation and the state's overall economic competitiveness is warranted. For example, IBM recently announced development of a software product called Mobile Equalizer. This software addresses the traffic management problem created by increasing numbers of teleworkers and mobile workers on networks. It allows a worker dialing into a system to manage the flow of information to a laptop. A window appears that lists all files and how long it would take to download each one. Rather than receiving a flood of information, a worker has the capacity to download only what is necessary.

Other ventures such as Trade Point Minnesota show promise in stimulating existing industries and establishing new ones.

Goal 5: Improved Quality of Life

Information and communication technologies will improve the quality of life in Minnesota

Information technology has the ability to improve quality of life by providing individuals, organizations, businesses and jurisdictions with access that includes, but is not limited to data, information, services and commercial transactions. One of the most dramatic examples is by facilitating the telepractice of professions, such as in telemedicine. This capability can bring health care specialties to under-served areas and in some situations lower costs. This access can also make products, services and information available to the end user, regardless of location. Global Positioning Systems for vehicles and boats, Cyberhomes® and Cyberstore© are other examples of taking the deliverables to the user.

Strategies

a. Restructure legal and regulatory framework

The areas of law and regulation that should be addressed include th[illegible]ready cited in addition to the regulation of professional licensing and censorship. The [illegible]ility of information technology to provide electronic access to gover[illegible]t, c[illegible]merce and professional services to customers, clients and patients has c[illegible]ated [illegible]arkets that cannot be defined in traditional geographic or legal jurisdictio[illegible]l t[illegible]s. [illegible]rrent regulation of licensed professions – such as physicians, attorneys, accou[illegible]nts, et[illegible] – and the current regulatory law for certain forms of business depend on such defini[illegible]ns of [illegible]practice area or market locations. These laws are designed to protect the pub[illegible]y setting entrance standards, ensuring continuing competency, and polici[illegible]rofessions and businesses for acceptable standards and practices.

The use of information technology to [illegible]ursue a professional practice without regard to geographic or jurisdictional borders h[illegible]ve[illegible]me known as telepractice or, as applied in the health care field, telemedicine. [illegible]n this practice takes place within specific geographical boundaries – such as within a sta[illegible] w[illegible]re a practitioner holds a license – there are few regulatory or legal imp[illegible]di[illegible]ts. H[illegible]wever, when the practice crosses a state line, questions about regulatory sta[illegible]dar[illegible] poli[illegible]ng tort claims and billing accountability may arise. These are all issues re[illegible]ed t[illegible] con[illegible]mer protection. These questions must be resolved to allow professionals to [illegible]e[illegible]actice without compromising consumer protection.

Since information te[illegible]nology is essentially a public medium in many of its manifestations, the balance between first amendment rights of expression, and private rights of exclusion must be established, just as it has for other public mediums such as radio, the press and television. Additionally, areas of law dealing with intellectual properties will need to accommodate the ability of information technologies to disseminate intellectual products in a new mode.

b. Expand electronic health care capabilities

Electronic commerce will continue streamlining and expediting management of medical records and administrative management systems. Minnesota has established itself as a leader in the implementation of administrative simplification through use of standardized forms for hospital and ambulatory claims for Medicare, Medicaid and GAMC throughout

Minnesota. Pilot projects implementing use of electronic medical records are underway. Many web sites give information on health care for consumers and health care providers.

Communication and information technologies give medical professionals access to diagnostics and allow implementation of treatment tools including surgical procedures with a doctor located in a region of the world apart from the patient. Training physicians has been revolutionized through computer simulations. For example, in virtual simulation now used at the University of Minnesota, a patient requiring shoulder surgery can have an image of his or her shoulder on a computer screen. The doctor can then practice on the simulation to make certain the intended procedure will accomplish the desired benefit before the patient undergoes the surgery.

c. Expand use of technology in arts and culture

Multimedia technologies can allow Minnesota organizations to transmit live performances to other portions of the globe and vice versa. Digitized images will allow greater access to art collections by students and citizens for study, research and enjoyment.

d. Improve environmental and natural resource stewardship

Shared databases of Minnesota's natural resources and measurements of air, water and soil quality are ways that citizens, businesses and government can access the condition of Minnesota's environment. Improved knowledge and better tracking mechanisms can aid in protection and enhancement on the environmental attributes most admired and relied upon in the state: our natural resources.

e. Expand access to community organizations

Just as cable television has provided the opportunities for community programming, Internet access can provide easy accessibility to community event scheduling. In the near future, live broadcasts of community sponsored events may be viewed via the Internet.

f. Integrate technology into Minnesota's transportation system

Information and communication technology will allow "virtual transport" from the personal computer to any connected location on the globe. An integrated transportation infrastructure is necessary for the physical movement of persons and goods by air, land and water. The virtual and physical infrastructures will be connected through the use of technology.

Already, technology allows an individual to schedule an airline flight and select the most competitive fare through e-ticketing. Delivery of physical goods by operations such as UPS, is already established and monitored from point of order to delivery through the vast technology infrastructure. In Minnesota, a person can access travel and road conditions through the World Wide Web. This is just the beginning.

Information Transportation Systems (ITS) is the application of technology to assist drivers in determining safe and short routes; warn of accidents and hazardous occurrences ahead; locate lost vehicles; automatically pay toll, lane and parking fees; and deploy safety and emergency vehicles. ITS will be fully integrated into Minnesota's transportation strategies

for the enhancement of safety, mobility, and economic vitality, for the protection of the natural environment, and for the development of sustainable communities.

g. Integrate technology in personal life planning and activities

Convenience, ease of use, speed and efficiencies have been long standing attributes of technology as adapted to equipment and processes in our homes, workplaces, and transportation modes. Examples in use today are global positioning systems in cars and the use of web sites, such as Cyberhomes®, to screen real estate from a computer.

In the near future a whole new industry of high definition TV will appear in our homes. Fox and ABC will use a "progressive" broadcasting format that can be viewed on computers or hybrid personal computer-television sets. Other networks will use an interlaced standard allowing zoned newscasts. The era of the one-size-fits-all newscast will disappear. For example, a family will be able to spend the first five minutes watching stories on national or regional news on Channel 4a. Then they could split channels 4a and [illegible] to view local news, split to 4c and view news for Hennepin County or 4d for Washington County.

Status Information for the Master Plan

What is "status" information?

Status information for this Master Plan is a compilation of present knowledge about technology and information resource management in Minnesota. "Status" describes what is known about:

- present conditions and what is currently in place
- efforts that are underway, or planned
- perceived gaps between what we have and where we are going

Status information provides a "snapshot in time" and is therefore static. The main uses of status information are:

- for future comparisons, to assess progress or to identify what has changed over time
- to make a record of what exists at a point in time
- to identify present gaps and define strategies for filling those gaps

Characteristics of "status" that should be understood include the following facts:

- Missing data is, by default, part of the status record
- Future comparisons can only be made to what is captured today
- Status says little, if anything, about the quality of current conditions
- Status information has questionable accuracy and completeness because it only includes what was quantifiable, or what people thought was important, at the time it was captured

What is included in the status information?

- Statistics and narrative about the status of activities within each goal area
- Project / program timelines for formally endorsed efforts (see Appendix)
- Projects / programs cross-referenced to goals and strategies (see Appendix)
- List of existing studies that were consulted when establishing this status information. Data may be used from these studies, however the research and analysis efforts that went into these studies will not be duplicated (see Appendix)
- Bibliography of other reference materials (created elsewhere) (see Appendix)

Status Toward Meeting Goals

Goal 1: Technically Literate and Competent Society

Strategies:

- Technical competency standards for new and current educators
- Technical competency standards for students
- Lifelong learning for all Minnesotans
- Promotion of technical literacy
- Awareness of emerging technologies and trends
- Universal equivalency for virtual course work
- Create and maintain a technically competent workforce

In Place:

- 56% of the 400 business executives surveyed by Twin Cities Business Monthly in November 1997 worry about attracting and retaining skilled workers.
- Technical competencies for teachers and learners were developed by MnSCU/U of M IT sub-committee for distance learning.
- K-12 competency standards are interwoven throughout portions of the graduation standards.
- MnSCU has incorporated hardware and software standards for campuses to use when purchasing applications for the classroom.
- 78% K-12 schools have a technology plan
- Estimated technical competency of state's K-12 teachers
  - 34% beginners or no skills
  - 45% intermediate skill level
  - 17% advanced skill level
- 70% of schools have an instructional technology coordinator responsible for supporting teachers in integrating instruction and technology.
  - 24% have a full-time coordinator
  - 44% have a part-time coordinator
  - 31% share a coordinator

- Status of bandwidth (a measure of information carrying capability. Larger bandwidths carry more information.)
  - 29% K-12 schools with Internet access have T1's (768kb)
  - 17% K-12 schools with Internet access have 56Kb capacity
  - Some schools have both
- 58% K-12 schools have a direct link to the Internet
- 37% K-12 schools have dial up access
- 55% of K-12 classrooms are connected to other classrooms via a LAN (local area network)
- 44% of K-12 classrooms are not connected to other classrooms via a LAN
- 53% of K-12 schools are connected to another school via a WAN (wide area network)
- 44% of K-12 schools are not connected to another school via a WAN
- 43% of K-12 teachers have an e-mail address
- 59% of K-12 schools use a WAN for instructional purposes; 27% of K-12 schools do not
- 75% of K-12 schools have WAN's used by teachers; 14% of K-12 schools do not
- 48% of K-12 schools allow student use on a WAN; 37% of K-12 schools do not
- 21% of K-12 students use the Internet for instructional purposes
- 22% of K-12 teachers use the Internet for instructional purposes
- Higher Education Expenditures:

  The state's higher education systems make significant annual investments in information technology. A February 1998 report highlighted the expenditures of central information management organizations within the 2 systems. Minnesota State Colleges and Universities (MnSCU) reported FY 1997 IT expenditures of $36.3 million. The University of Minnesota (U of MN has budgeted $68.0 million for FY 1998. Actual IT expenditures, including the costs of IT distributed throughout the systems, are even greater.

  The systems are engaging in a number of development projects designed to improve student access to technology, train faculty in the use of technology, deliver courses via the Internet, and provide better information to students.

- Partnership degrees in Information Networking and Network Communications through the community college partnerships.
- Crookston Laptop University
- MnSCU common student information systems that will be used by all MnSCU colleges and universities in the state (funded 1998 / 1999).

- Rochester Center
- U of M Digital Media Center
- MnSCU Electronic Academy
- MnSCU Laptop programs at Winona, Bemidji & Northwest Technical College
- U of M faculty training through the Digital Media Center
- UMD Information Technology Initiative
- MnSCU Teaching, Learning & Technology Roundtables
- MnSCU web-based clearinghouse
- MnSCU faculty training and technical support
- MnSCU Electronic Academy Summer Institute
- U of M course web site project
- MnSCU electronically enhanced curricula via the Learning Network of Minnesota
- U of M biocatalysis/biodegradation database as a teaching tool
- U of M at Morris general education for the liberal arts online
- MnSAT (Minnesota Satellite and Technology
- Minnesota Education Telecommunications Council (METC)
- U of M & MnSCU information technology training
- U of M & MnSCU math distance learning initiative
- U of M laptop program for delivering nutritional education to food stamp families
- U of M Web 66
- EDUCOM
- U of M Extension Service Master Internet Volunteer Program for training volunteers to teach people in their communities about the Internet.

In Process:

- MnSCU/U of M competency standards for distance learning are currently being incorporated into the curriculum.
- Virtual University
- IBM/University of Minnesota Alliance
- ISEEK (Internet System for Education and Employment Knowledge)

- Board of Teaching rulemaking process to define competency standards for teacher licensing in K-12.
- DCFL Learning Academy in summer 1998 for K-12 teachers to increase technology skills.
- MN LINK
- Laurentian College laptop program
- U of M Library Digital Initiatives
- U of M online library instruction project/Research QuickStart & QuickStudy
- Nursing Pharmacology project by MnSCU & U of M
- MnSCU equipment acquisition for workforce training **
- MnSCU workplace technology center **
- MnSCU targeted industry partnerships **
- MnSCU Benchmarking study of faculty instructional development

The gap between what we have and where we are going:

- Full scale integration of technology into all aspects of teaching and learning processes in K-12 and higher education.
- Standards for interoperability, portability and scalability of hardware and software for applications in the K-12 classrooms
- Access gaps across the state by inadequate bandwidth in some communities.
- Unaffordable access in some locations
- Specific standard or element of profile of learning for K-12 technology

Goal 2: Efficient and Effective Government

Strategies:

- Improve service delivery using technology
- Achieve quality through continuous process improvement
- Achieve consistency through common policies, standards and guidelines
- Measure progress toward efficiency and quality strategies
- Use technology to support business goals and outcomes
- Effectively manage information resources
- Restructure legal and regulatory framework

In Place:

- State Agency Expenditures:

  State agencies view focused investment in information technology as critical to the delivery of quality public services. A recent analysis of FY 1997 IT expenditures revealed that state agencies, not including the MnSCU system, spent at least $246.3 million on IT-related personnel and commodities. Expenditures on IT continue to grow. Between FY 1995 and FY 1997, state IT expenditures grew at an annual rate of approximately 13%. It is realistic to expect similar rates of growth in the future.

- State agencies participate in one or more functional areas, referred to in a study as "lines of business". The following indicates the % of agency participating in each line of business:
  - Commercial growth and conduct – 55%
  - Citizen safety – 36%
  - Human and health services – 27%
  - Citizen learning – 32%
  - Environmental stewardship and recreation – 26%
  - Government support services – 32%

  Most agencies are involved in multiple lines of business.

- Data Practices Act
- Records Management Act
- Information Management Principles (management, data, people, and standards)
- Information Resource Management Six Critical Success Factors (CSFs) (executive leadership, policies/standards/guidelines, planning, models, organization, and skills)

Agency progress with CSFs:

- 1996-1997 biennium 20 agencies completed the CSFs;
- 1998-1999 biennium 24 agencies completed the CSFs
- 1996-1997 biennium ratings were: 1 excellent, 6 good, 7 satisfactory, 3 fair, 2 poor, 1 N/A
- 1998-1999 biennium ratings were: 4 excellent, 13 good, 7 satisfactory, 0 fair, 0 poor

- Information Policy Council (IPC)
- Library Planning Task Force
- Intergovernmental Advisory Council for Technology (IACT) – formerly known as Intergovernmental Information Systems Advisory Council (IISAC)

- Minnesota Education Telecommunications Council (METC)
- Minnesota Health Data Institute (MHDI)
- Governor's Council on Geographic Information (GIS Council)
- GIS Metadata "Clearinghouse" (including free software for the public sector to create common metadata
- Criminal Justice Data Community
- Statewide Network Access Planning (SNAP) Group
- Data Issues Group (DIG IT)
- North Star
- Statewide Network MNet (data, voice and video)
- Electronic Mail Hub
- Electronic Data Interchange (EDI) Translator and Value Added Network (VAN)
- Statewide Accounting, Procurement, H/R, Payroll and Information Access
- Application Development Methodology and Process Management Master Contracts
- Project Management Training Master Contract
- Information Resource Management Handbook (policies, standards and guidelines)
- Information Resource Modeling Master Contract
- Risk Assessment Master Contract
- Budget Review and Recommendation Process
- Minnesota Authentication and Digital Signature Laws (1997)
- Annual Computer Symposium
- Community Data Models (Criminal Justice and Metro GIS)
- Agency Chief Information Officers (CIOs) (15 agencies identified)
- Agency Training in Data Management, Data Modeling and Project Management (approximately 500 employees trained)
- Agency Data Warehouses (4 built)
- Agency Pool of Recording Analysts (for modeling)
- IT Expenditure Tracking (FY1998)
- IT System Inventory (1998 expansion of Year 2000 inventory)

In Process:

- IPC Committees
  - Administrative Information Access Policy
  - Electronic Procurement, Payments and Receipts
  - Electronic Government Services
  - Human Resources
  - IT Financing Structure and IT Biennial Budget Format
  - Metadata Project
  - Network Transport Project
  - Project 2000
  - Security Policy and Guidelines
  - State Government Administrative Systems Proje
  - Telecommunications Collaboration Project
- North Star II and Its Pilots
- Information Policy Task Force (review MS ter 13)
- Agency Enterprise Models
- Agency Data Warehouses (2 planned nticipated in the future)
- Procurement reform
- Mechanism to retain n ofessionals; increased job recognition for data management profession technology skills, implementation capabilities developed

The gap between what we hav and where we are going:

- The Department o evenue computer system for income tax is in dire need of re-engineering.
- Funding mechanisms and organizational structures that recognize, validate and reward multi-jurisdictional efforts; accountability and funding issues resolved
- Data Practices complications resolved; legal limitations for data exchange and reuse (federal and state) revisited; conflicts in Minnesota laws resolved (between efficiency and privacy); legal admissibility of records and "trustworthy systems" established; data exchange authorized; inconsistent legal definitions resolved
- Uniform Business Identifier
- Directory Services

- Metadata Standards and Guidelines
- Metadata Repositories for Statewide Use
- Statewide Architecture
- Minnesota Process Improvement / Process Management Methodology and Measurements for Progress
- Data Practices "Responsible Authority" named for each governmental unit (60% without)
- Records Retention Schedule in place for every governmental unit
- Executive, responsible for information resource management and information technology, designated in all state agencies

Goal 3: Easy and Affordable Access

Strategies:

- Expand technology infrastructure
- Improve consistency, security and reliability of technology infrastructure
- Stimulate competition
- Ensure universal access
- Ensure technology solutions are interoperable, scaleable, portable and interconnect with other technology solutions
- Restructure legal and regulatory framework

In Place:

- Access Minnesota is a 56K Extension Service public access to the Internet. The average cost per county for connectivity is $2500 per year.
- 89% or 949 K-12 schools have Internet access
- State government use of EMail: 45 agencies on State EMail hub, providing Email interoperability and with interconnectivity for state employees through the state directory (these employees have individual EMail addresses that are synchronized through the hub); 5 more agencies have EMC2 access; the rest of the agencies are not connected to the EMail hub.
- North Star Interactive applications

  DocFinder

  Teacher licensing

  Campaign financing

Supreme Court opinions

Appellate opinions search engine

Minnesota tobacco case updates

- 19 library system have filed technology plans
- 11 regional library systems provide Internet access to the public
- 1 library system has Internet service for staff only
- TAG funds have provided several libraries with T1 or 56KB access
- All regional library systems have on-line catalog access
- All regional library systems are connected through a WAN OR LAN or both

In Process:

- US West is adding 34 ADSL switches to its central offices du[illegible] th[illegible]ond quarter of 1998.
- North Star interactive applications

  Cross country ski permits

  Fetal alcohol web site

  DocFinder current disciplinary actions

  Minnesota Historical Society on-[illegible] book sales

  State Park stickers

  Building contractor licenses
- Connecting Minnesota [illegible]er o[illegible]ic network)
- Internet Center[illegible]
- 9 regional librarie[illegible]anning to become gateways to MnLINK

The gap between what we have and where we are going:

- About ½ of state government lacks interoperability and interconnectivity from an EMail perspective.
- Need to "expand the technology to their doors" (citizen connectivity)

Goal 4: Stimulated Economic Development

Information and communication technologies will stimulate Minnesota's economic development

Strategies:

- Restructure legal and regulatory framework
- Expand consumer use of technologies for commerce
- Develop technical standards and protocols
- Promote E-Commerce infrastructure development

In Place:

- Minnesota Trade Point Association
- Minnesota Technologies, Inc.
- Minnesota High Technology Council/Minnesota Software Association
- Digital Signature Laws (Departments of Administration & Public Safety)
- Digital Authentication Act (Secretary of State)
- Access Minnesota sites in 68 counties (public Internet access)
- Luminet in Winona
- GrandNet in Itasca County
- The Red River Corridor in northeastern Minnesota
- Telework Center in Cambridge
- Contract for deployment of public-private fiber optics backbone network
- Internet Center Clearinghouse in St. Cloud

In Process:

- Trade Point Minnesota is an Internet based tool allowing individuals, small and medium sized businesses to conduct electronic trading on a global network.
- SEAL, a secure electronic authentication link under development by the University of Minnesota, in conjunction with the United Nations, to work with Trade Point.
- Deployment of the public-private fiber optic backbone network for access to advanced telecommunications services as well as Internet access throughout Minnesota.
- Internet II --a University of Minnesota-led, cooperative effort with government and industry partners-- is the high performance, high capacity network project which focuses on connectivity, speed, bandwidth and quality of service necessary to support high performance computing on the Internet.
- Enhancing Rural Development Through Electronic Commerce – University of Minnesota project to expand access to Trade Point to small communities
- Internet Center in St. Cloud

- Minnesota Biomedical Business Network

The gap between what we have and where we are going:

- Modification of established rules, policies, regulations and legal structures that currently govern trade and services, locally and internationally
- Secure electronic commerce capabilities
- Digital authentication and digital signature implemented
- Policies regarding electronic data capture, activity tracking, privacy and confidentiality
- Standardized IT security policies
- Public access points to electronic commerce technologies
- Expanded infrastructure and access to broad bandwidth network
- Adoption of technical standards and protocols for interconnectivity and interoperability
- Additional Internet Centers

Goal 5: Improved Quality of Life

Strategies:

- Restructure legal and regulatory framework
- Expand electronic health care capabilities
- Expand use of technology in arts and
- Improve environmental and natural resource stewardship
- Expand access to community organizations
- Integrate technology in personal life planning and activities (e.g., GPS in cars; Cyberhomes®)

In Place:

- 7 telemedicine networks
- Standardized forms for health care transactions
- Pilot projects for enrollment and eligibility in government provided health care programs
- Organizations supporting the following arts mediums

  Book and paper arts

  Cartooning

  Ceramics

Computer arts

Dance

Design and illustration

Children's book illustrators

Calligraphy

Fashion arts

Fiber arts

Jewelry

Media arts

Metals

Music

Printmaking

Public art

Sculpture

Storytelling

Theater/Performance

Visual arts

Watercolor

Writing

- Media education
- 73 film & video students at Minneapolis Community College 1996-7
- Program costs for film & video production curricula at Minneapolis Community College 1996-7 was $213,000
- Program cost per student at Minneapolis Community College for film & video production $2905
- Distance Learning for arts
- Variable Message Signs (VMS) advising travelers of road conditions
- DOT web site with Java related maps for reviewing traffic patterns
- On-line access to automated catalogs and publications through regional library system
- Governor's Council on Geographic Information (GIS Council)

- GIS Metadata "Clearinghouse" (including free software for the public sector to create common metadata
- Metro GIS data model (Met Council project to define common data used by public and private sector organizations in the metro area)
- Metadata Guideline for GIS metadata
- GIS standards for state and county codes

In Process:

- Expansion of telemedicine
- Index to web based health care sites
- Minnesota Asthma Research Center
- Electronic commerce standards for health care
- Expansion of electronic commerce for health care
- Technology and Music summer camp
- Digital portfolio's for artists and students
- Advanced Traveler Information Systems (ATIS), a set of technology assisted devices that will provide optional vehicle location and traveler assistance. An example is adaptive cruise control to allow speed and safe spacing to be transmitted from roadside to vehicle.
- Commercial Vehicle Operation (CVO) will mechanize the current labor-intensive system of monitoring registration, fuel tax, operating authority, insurance, hazardous-waste authority and permitting.
- Metro GIS Web Index Project
- Integrated Access to Environmental Information ("Foundations" Project)

The gap between what we have and where we are going:

- Legal and regulatory restructuring of telemedicine, reimbursement policies
- Analysis of cost benefit of telemedicine
- Policies governing security and access to health care data bases
- Interoperability of health care systems

Phase II: The Process

The Process for Expanding the Master Plan

The statewide plan for information technology will be the "blueprint for action" leading Minnesota into the digital age, and affecting numerous "stakeholders" inside and outside of government. Each stakeholder has a special interest and will be affected differently by the plan, depending on their business functions and uses of technology. For the plan to be relevant, vital, feasible and attainable, all stakeholder groups need to have a voice in its development and content. Therefore, Phase II will enhance the original plan through the inclusion of stakeholder input. The process for enhancing the plan will include the following activities:

1) Identify stakeholders

This activity ensures affected stakeholders have been identified for participation in facilitated, structured forums to carry forward steps two through four listed below. Stakeholder groups include such entities as government (state, local), education (K-12; higher education), libraries, health care, the arts, citizens and various other segments of the public and private sectors. Participation ensures that input is obtained from a representative sampling of a variety of special interest groups. Stakeholders will be key players in determining what should be in the scope of the plan, as well as ultimately helping to realize its promise.

The Office of Technology will provide the structure for the format of each forum to ensure consistency across all stakeholder groups in soliciting useful and usable information.

2) Define plan parameters

a) Define benefits, outcomes and goals

Statewide information technology plans will focus on using technology to achieve benefits and outcomes for stakeholders. Master Plan goals, which are based on realizing benefits and outcomes, include technical literacy, an efficient and effective government, electronic access to information for all citizens, or electronic commerce capabilities. Therefore a key activity in the process of determining scope is to define desired benefits, outcomes and goals for the state as a whole, and for its various stakeholder groups.

b) Define strategies

Strategies provide a foundation for reaching goals without being tied directly to specific results. They are enablers that can support multiple outcomes. Examples of strategies include "interoperability" between computers, leveraging resources, or providing universal access to government information. Defining strategies is another key activity in determining the scope of the plan.

c) Determine plan boundaries (scope)

The statewide information technology plan parameters also describe what is included and excluded in its scope. The scope defines which goals and strategies are applicable, or not applicable, for each stakeholder. The scope also includes stakeholder roles in attaining results from the plan, thereby laying groundwork for implementation.

d) Other

Plan parameters also identify other factors that may affect its success, such as risks, opportunities, constraints, issues and assumptions.

3) Assess capabilities

a) Baseline

The Master Plan depends on a baseline which consists of capabilities in technology, management, legal and regulatory areas for implementation. The first step towards acquiring these capabilities is to establish what is already in place (the baseline). One component of this baseline is an initial systems inventory for state government. The Office of Technology has developed this inventory and reported to the legislature. Another component of the baseline should describe the state's ability to access and share data between public and private IT systems and management systems in a digital age. Key to digital age baselines is a legal structure that acknowledges data access, data sharing and records management. Once all components of this baseline are established, projects and programs that support the overall goals and objectives can be advanced.

The final baseline will be built using initial status information developed in Phase I of the Master Plan.

b) Unmet needs

Technological capabilities that are needed, but not met by the existing baseline, will be identified as "unmet needs" within the plan. Initial status information in Phase I of the Master Plan included summaries of gaps. When Phase II has more fully flushed out the goals and strategies, the gap baseline can be completed. Specific actions for implementing the plan can then be identified and prioritized based on existing capabilities and the ability to acquire those that are lacking.

4) Identify tactics

Tactics for attaining plan results are defined as projects, programs, ideas and plans that are directed at achieving specific results. Existing projects and programs make up part of the initial status developed in Phase I of the Master Plan. A "project" is a *time-dependent* effort that consists of resources, a specified set of results (products, services, etc.) and a definite time span with beginning and ending dates. A "program" is an *ongoing* effort, consisting of resources and results that may be either tangible or intangible and does not have an end date. Ideas and plans are less formal and not as committed as projects and programs, but have the potential to become more formal and committed.

a) Existing

Tactics that already exist in support of the plan's scope will be identified along with the entities responsible for their success.

b) Needed

Gaps will be identified so that when existing or planned tactics do not address all needs or are not achievable, alternative plans can be developed to meet the desired benefit or outcome.

Refer to "Preliminary Sampling of IT Projects and Programs" for examples of some of the known projects and programs that are currently underway.

5) Writing the plan

The Office of Technology will take the lead in drafting the final plan based on the information provided by each of the facilitated forums. Each stakeholder group will have an opportunity to review and respond to the drafted section of the plan to ensure that content is consistent with the intent prior to the final publication.

6) Implement tactics

Stakeholders share responsibility for implementation of the Master Plan either through oversight or by conducting and managing the actual work on the projects and programs. Tactics will be reviewed annually to determine if a goal or strategy has been maximized or if additional efforts are needed in the future.

Conclusion

Creation of a master plan is a daunting task, but necessary to guide Minnesota through the digital age. Implementation of the plan will help to ensure that its citizens will be good thinkers, creative, always learning, with skills to compete internationally. The possibilities of where this process will lead are endless, but will most certainly address the state's commitment to a well-educated populace, a thriving economy, and a responsive public sector. Stakeholder groups are central to the mission of this process.

From now through October, we will become engaged with hundreds of stakeholders identifying the strategies that define our collective vision of the future. Watch the Office of Technology web site (www.ot.state.mn.us) for future developments or call the Minnesota Office of Technology at 612-215-3878.

Appendices

Programs and Projects In Support of Goals and Strategies DRAFT

Project or Program	Goal 1: Technically Literate and Competent Society	1a: Educator competence	1b: Student competence	1c: Lifelong learning	1d: Promotion of literacy	1e: Emerging technologies/trends	1f: Universal course equivalency	1g: Workforce competency	Goal 2: Efficient and Effective Government	2a: Leverage resources	2b: Improve service delivery	2c: Continuous process improvement	2d: Common policies, standards and guidelines	2e: Measure progress	2f: Support business goals/outcomes	2g: Effective information resource management	2h: Restructure legal and regulatory frameworks	Goal 3: Easy and Affordable Access	3a: Expand technology infrastructure	3b: Improve infrastructure reliability	3c: Stimulate competition	3d: Universal access	3e: Interoperability and interconnectivity	3f: Restructure legal and regulatory frameworks	Goal 4: Stimulate Economic Development	4a: Restructure legal and regulatory frameworks	4b: Expand technology use for commerce	4c: Technical standards and protocols	4d: Promote E-commerce infrastructure development	Goal 5: Improved Quality of Life	5a: Restructure legal and regulatory frameworks	5b: Electronic health care	5c: Technology in arts and culture	5d: Environmental stewardship	5e: Access for community organizations	5f: Expand transportation system technologies	5g: Technology for personal life planning
800 MHz Public Safety Network											X							X																			
Agency Collaborations Program										X	X	X	X		X	X																					
Alternative IT funding for state government										X	X		X		X	X																					
Boards and Council Study (technology related)										X																											
Capital Budget										X	X					X																					
Community tools for state government										X	X		X		X	X																					
Computer Recycling Program			X		X																															
Connecting Minnesota						X				X								X		X	X				X		X								X	
Criminal Justice Information Systems										X	X				X	X		X				X														
Curriculum Library			X																																	
Data Practices													X				X																			
Data Resource Management Program										X	X	X	X		X	X																					
Data Resource Management: DIG-IT										X		X	X		X	X																					
Data Resource Management: State Metadata Project										X			X		X	X																					
Authentication																									X		X	X									

Programs and Projects In Support of Goals and Strategies

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Project or Program	Goal 1: Technically Literate and Competent Society									Goal 2: Efficient and Effective Government									Goal 3: Easy and Affordable Access								Goal 4: Stimulate Economic Development								Goal 5: Improved Quality of Life							
	1a: Educator competence	1b: Student competence	1c: Lifelong learning	1d: Promotion of literacy	1e: Emerging technologies/trends	1f: Universal course equivalency	1g: Workforce competency			2a: Leverage resources	2b: Improve service delivery	2c: Continuous process improvement	2d: Common policies, standards and guidelines	2e: Measure progress	2f: Support business goals/outcomes	2g: Effective information resource management	2h: Restructure legal and regulatory frameworks			3a: Expand technology infrastructure	3b: Improve infrastructure reliability	3c: Stimulate competition	3d: Universal access	3e: Interoperability and interconnectivity	3f: Restructure legal and regulatory frameworks			4a: Restructure legal and regulatory frameworks	4b: Expand technology use for commerce	4c: Technical standards and protocols	4d: Promote E-commerce infrastructure development			5a: Restructure legal and regulatory frameworks	5b: Electronic health care	5c: Technology in arts and culture	5d: Environmental stewardship	5e: Access for community organizations	5f: Expand transportation system technologies	5g: Technology for personal life planning	
Digital Portfolio for Artists and Students						X																											X						X
Distance Learning for the Arts				X			X																										X						
E-Rates				X	X																													X						
Electronic Government Services											X			X																										
Electronic Medical Records																																	X	X						
Electronic purchasing, procurements, payments and receipts										X	X			X		X																								
Emerging Technologies Program						X													X	X	X	X					X													
Environmental Information Access										X	X			X																					X						
Expenditure Tracking													X		X																									
Health Care Electronic Commerce																																	X	X						
Information Architecture										X			X		X																									
Information Resources Plan & Management													X		X																									
Information Security													X						X										X											
Intellectual Property																X								X																
International Telecommunications Union (ITU)																X			X	X	X	X	X	X			X	X	X	X										

Programs and Projects In \ pport of Goals and Strategies

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Project or Program	Goal 1: Technically Literate and Competent Society								Goal 2: Efficient and Effective Government								Goal 3: Easy and Affordable Access								Goal 4: Stimulate Economic Development								Goal 5: Improved Quality of Life							
	1a: Educator competence	1b: Student competence	1c: Lifelong learning	1d: Promotion of literacy	1e: Emerging technologies/trends	1f: Universal course equivalency	1g: Workforce competency		2a: Leverage resources	2b: Improve service delivery	2c: Continuous process improvement	2d: Common policies, standards and guidelines	2e: Measure progress	2f: Support business goals/outcomes	2g: Effective information resource management	2h: Restructure legal and regulatory frameworks	3a: Expand technology infrastructure	3b: Improve infrastructure reliability	3c: Stimulate competition	3d: Universal access	3e: Interoperability and interconnectivity	3f: Restructure legal and regulatory frameworks	4a: Restructure legal and regulatory frameworks	4b: Expand technology use for commerce	4c: Technical standards and protocols	4d: Promote E-commerce infrastructure development	5a. Restructure legal and regulatory frameworks	5b: Electronic health care	5c: Technology in arts and culture	5d: Environmental stewardship	5e: Access for community organizations	5f: Expand transportation system technologies	5g: Technology for personal life planning
Internet Center																	X			X										X								
Internet Center Seed Grants																	X			X										X								
IRM Education and Training for State Government												X			X																							
ISEEK								X									X																					
IT Budget										X				X																								
IT Evaluation for state government												X		X		X																						
Learning Academy		X		X	X																																
Learning Network of Minnesota				X													X																				
Library Technology Site Grants																	X																				
Media Education (Arts)						X	X																				X			X		X					
Minnesota Guidestar Project																																	X	X			
MNet Consultation																		X																			
MnLink											X						X			X																	
MnSCU Electronic Academy					X						X						·																				
North Star II										X	X	X	X		X	X	X			X																		

Programs and Projects In ... pport of Goals and Strategies

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Project or Program	Goal 1: Technically Literate and Competent Society								Goal 2: Efficient and Effective Government								Goal 3: Easy and Affordable Access								Goal 4: Stimulate Economic Development								Goal 5: Improved Quality of Life							
	1a: Educator competence	1b: Student competence	1c: Lifelong learning	1d: Promotion of literacy	1e: Emerging technologies/trends	1f: Universal course equivalency	1g: Workforce competency		2a: Leverage resources	2b: Improve service delivery	2c: Continuous process improvement	2d: Common policies, standards and guidelines	2e: Measure progress	2f: Support business goals/outcomes	2g: Effective information resource management	2h: Restructure legal and regulatory frameworks	3a: Expand technology infrastructure	3b: Improve infrastructure reliability	3c: Stimulate competition	3d: Universal access	3e: Interoperability and interconnectivity	3f: Restructure legal and regulatory frameworks	4a: Restructure legal and regulatory frameworks	4b: Expand technology use for commerce	4c: Technical standards and protocols	4d: Promote E-commerce infrastructure development	5a: Restructure legal and regulatory frameworks	5b: Electronic health care	5c: Technology in arts and culture	5d: Environmental stewardship	5e: Access for community organizations	5f: Expand transportation system technologies	5g: Technology for personal life planning
One-Stop Business Services									X	X				X			X				X																X
Online Journal Access										X										X																	
Private Sector Incentives																									X												
Process Improvement for IT (State Government)											X				X																						
Procurement Reform/Practices									X	X					X	X																					
Report on State Agency Systems Inventory									X					X	X																						
Redundant Data Storage in Minnesota Government															X																						
School Technology Site Grants				X													X																				
Standards and Guidelines Development											X																										
Technology and Music Summer Camps																																			X		
Telecommunications Collaboration Project									X	X					X																						
Telecommuting/Telework Program									X	X				X	X																						
Telemedicine Program																							X								X	X				X
Trade Point Minnesota																	X					X			X											
Transition to Digital TV (was "High Definition TV")				X													X																			

Programs and Projects In S pport of Goals and Strategies

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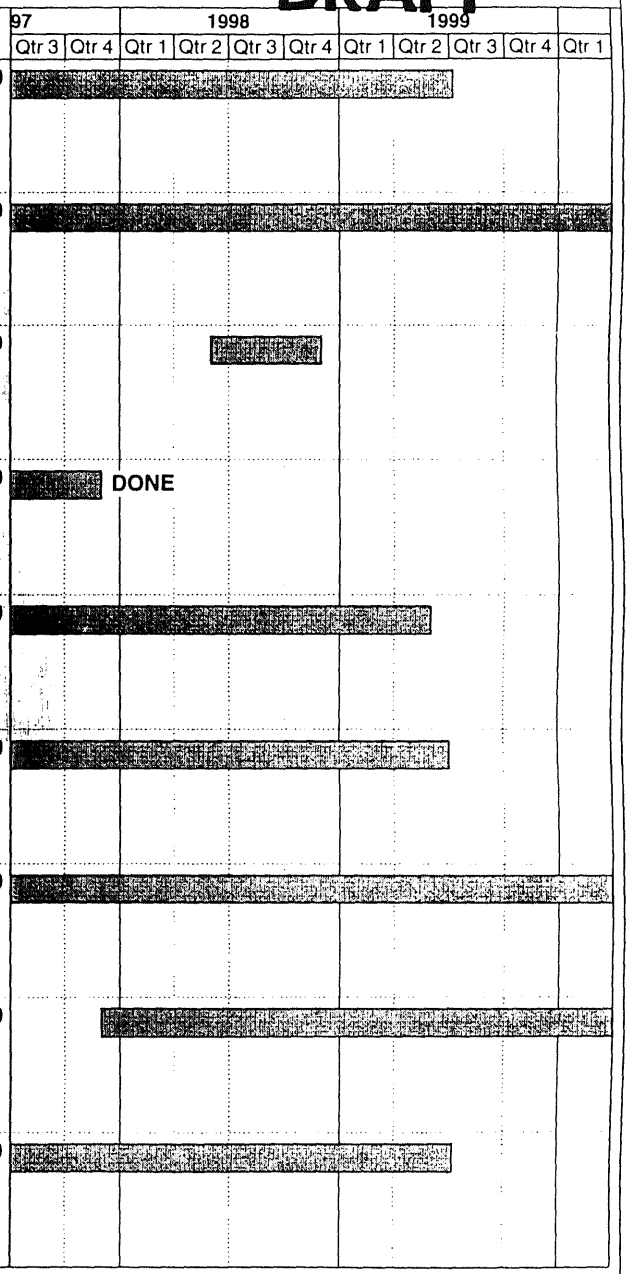
Project or Program	Goal 1: Technically Literate and Competent Society	1a: Educator competence	1b: Student competence	1c: Lifelong learning	1d: Promotion of literacy	1e: Emerging technologies/trends	1f: Universal course equivalency	1g: Workforce competency	Goal 2: Efficient and Effective Government	2a: Leverage resources	2b: Improve service delivery	2c: Continuous process improvement	2d: Common policies, standards and guidelines	2e: Measure progress	2f: Support business goals/outcomes	2g: Effective information resource management	2h: Restructure legal and regulatory frameworks	Goal 3: Easy and Affordable Access	3a: Expand technology infrastructure	3b: Improve infrastructure reliability	3c: Stimulate competition	3d: Universal access	3e: Interoperability and interconnectivity	3f: Restructure legal and regulatory frameworks	Goal 4: Stimulate Economic Development	4a: Restructure legal and regulatory frameworks	4b: Expand technology use for commerce	4c: Technical standards and protocols	4d: Promote E-commerce infrastructure development	Goal 5: Improved Quality of Life	5a: Restructure legal and regulatory frameworks	5b: Electronic health care	5c: Technology in arts and culture	5d: Environmental stewardship	5e: Access for community organizations	5f: Expand transportation system technologies	5g: Technology for personal life planning
Universal Resource Locator for the Arts																										X						X		X			
Universtty of Minnesota's Digital Summit																										X	X	X									
Virtual U				X							X											X															
Wireless Technology										X	X				X	X			X					X													
Year 2000 Project																X																					

Statewide Information and Communica n Technology Projects and Programs DRAF

ID	Strategies	Projects & Programs	Description	Resp Org	Appropriation
1	2b; 3a	800 MHz Public Safety Network	Regionwide infrastructure communication system for law enforcement and emergency medical services.	DOT (for funding)	$9,900,000.00
2	2a, b, c, d, f, g	Agency Collaborations Program	Actively seeking opportunities for resource sharing and coordinated systems development.	OT	$0.00
3	2a, b, d, f, g	Alternative IT funding for state government	Identify alternative funding strategies for state government IT investments	OT and IPC	$0.00
4	2a	Boards and Councils Study (technology related)	Legislatively mandated study on possible consolidation of boards and councils (due December 1997).	OT	$0.00
5	2a, b, g	Capital Budget	OT is obligated to ensure that all agencies proposing capital budget expenditures prepare a plan for cost-effective technology investments and telecommuting plans.	OT	$0.00
6	2a, b, d, f, g	Community tools for state government	Identify and promote common usage of technical solutions	Admin. and OT	$0.00
7	1b, d	Computer Recycling Program	Public-private recycling partnership to provide multimedia computers for schools. The program will reduce the ratio of students per multimedia computer from 1:22 to 1:7 over three years, making Minnesota the national leader.	CFL and Corrections	$6,000,000.00
8	1e; 2a; 3a, c, d; 4b, d; 5f	Connecting Minnesota	ROW (Right of Way) fiber optic backbone. Will place fiber in interstate right of way; state receives 20% of initial lighting free.	DOT and Admin.	$0.00
9	2a, b, f, g; 3a, e	Criminal Justice Information Systems	New network to improve information and telecommunications capabilities in the public safety and criminal justice systems.	Criminal Justice Policy Group	$11,546,000.00



NOTE: Programs are defined as ongoing eff s that do not have established end dates.

Statewide Information and Communica...n Technology Projects and Programs

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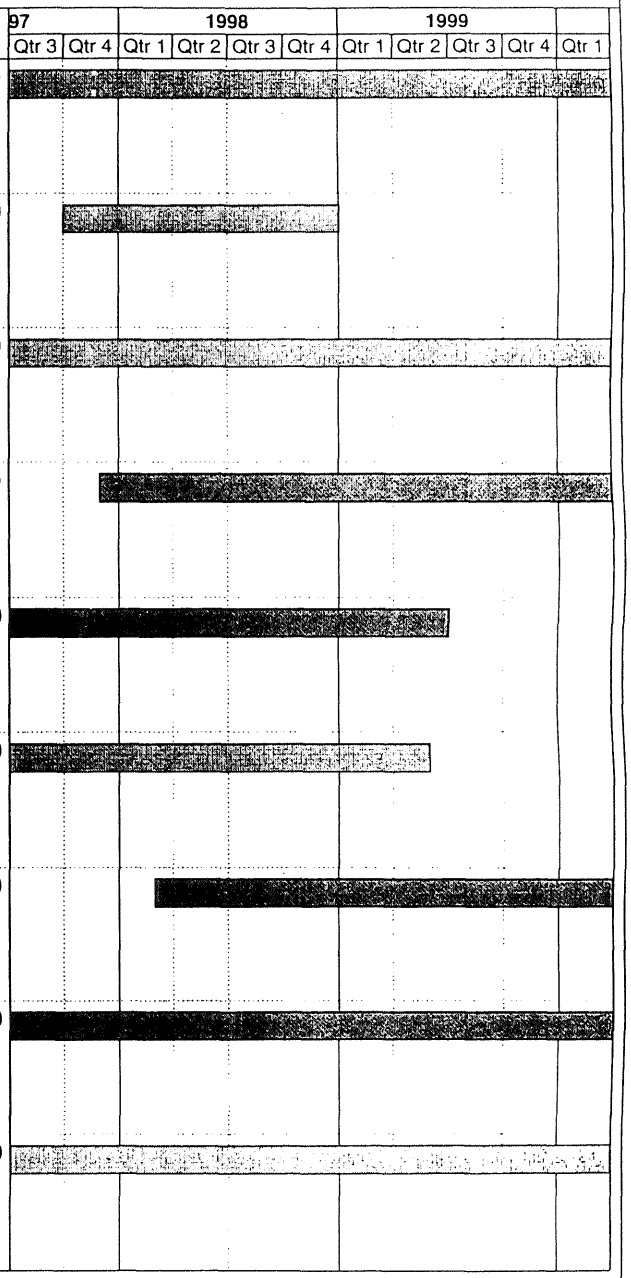
ID	Strategies	Projects & Programs	Description	Resp Org	Appropriation
10	1b	Curriculum Library	K-12 curriculum network designed to help students, teachers and parents meet Minnesota's graduation standards.	CFL	$5,000,000.00
11	2d, h	Data Practices	Task force established to review statutory provisions to address data privacy issues associated with technology changes.	Admin. and MN Planning	$0.00
12	2a, b, c, d, f, g	Data Resource Management Program	An effort to assess state government's data resources and create mechanisms for describing that data in a common format and enable sharing of data resources.	IPC	$0.00
13	2a, c, d, f, g	Data Resource Management: DIG-IT	Organize and operate DIG-IT (Data Issues Group - Information Technology), an IPC subcommittee working to educate and leverage state resources for data management.	IPC and OT	$0.00
14	2a, d, f, g	Data Resource Management: State Metadata Project	Multi-agency effort to establish guidelines for statewide metadata.	MHS and LMIC and OT	$0.00
15	4a, c, d	Digital Authentication	Statutory framework established for digital authentication and electronic signatures to enable secure electronic commerce in Minnesota. Task force created to advise on rule-making requirements.	SOS	$50,000.00
16	1e; 5c, g	Digital portfolio for artists and students	Develop digital portfolio capabilities for artists and students.	Minnesota Resource Center for the Arts and private sector	$0.00
17	1c, f; 5c	Distance Learning for the Arts	Provide access for all students to art learning opportunities via technology. Includes arts education opportunities for students in rural areas.		$0.00
18	1c, d; 5b	E-Rates	Assist consortia applications for federal funding to address education and rural health care.	METC, CFL , OT and private industry	$0.00



NOTE: Programs are defined as ongoing efforts that do not have established end dates

Statewide Information and Communica. .ı Technology Projects and Programs

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ID	Strategies	Projects & Programs	Description	Resp Org	Appropriation	97 Qtr 3	97 Qtr 4	1998 Qtr 1	1998 Qtr 2	1998 Qtr 3	1998 Qtr 4	1999 Qtr 1	1999 Qtr 2	1999 Qtr 3	1999 Qtr 4	Qtr 1
19	2b, f	Electronic Government Services	An effort to define government's opportunities for delivery of services electronically.	OT	$0.00											
20	5a, b	Electronic Medical Records (EMR)	Facilitate EMR's that are open (rather than proprietary) to allow data sharing.	Health Care Industry; OT, MHDI	$0.00											
21	2a, b, f, h	Electronic purchasing, procurements, payments and receipts	Explore issues and technologies impeding or enabling state use of electronic purchasing, payments and receipts. Determine common solutions and next steps.	IPC	$0.00											
22	1e	Emerging Technologies Program	Ongoing evaluation of relevant technologies emerging in the marketplace. Exploring impacts and applicability on the public and private sectors.	Industry	$0.00											
23	2a, b, f; 5d	Environmental Information Access	Foundations project, to provide access via Internet to environmental and natural resource information, focused on citizen access.	MN Planning Office and DNR	$0.00											
24	2e, g	Expenditure Tracking	Legislative responsibility to identify and quantify state technology investments.	OT	$0.00											
25	5a, b	Health Care Electronic Commerce	Ongoing development of transaction standards for health care.	MHDI	$0.00											
26	2a, d, g	Information Architecture	Develop and establish a state information architecture to ensure that information and communications systems, equipment and services complement and do not needlessly duplicate those of others.	OT	$0.00											
27	2d, g	Information Resources Plan & Management	Develop and promote IRM capabilities within state government. Establish policies, standards and guidelines.	OT	$0.00											

NOTE: Programs are defined as ongoing ·ts that do not have established end dates.

Statewide Information and Communica .ı Technology Projects and Programs

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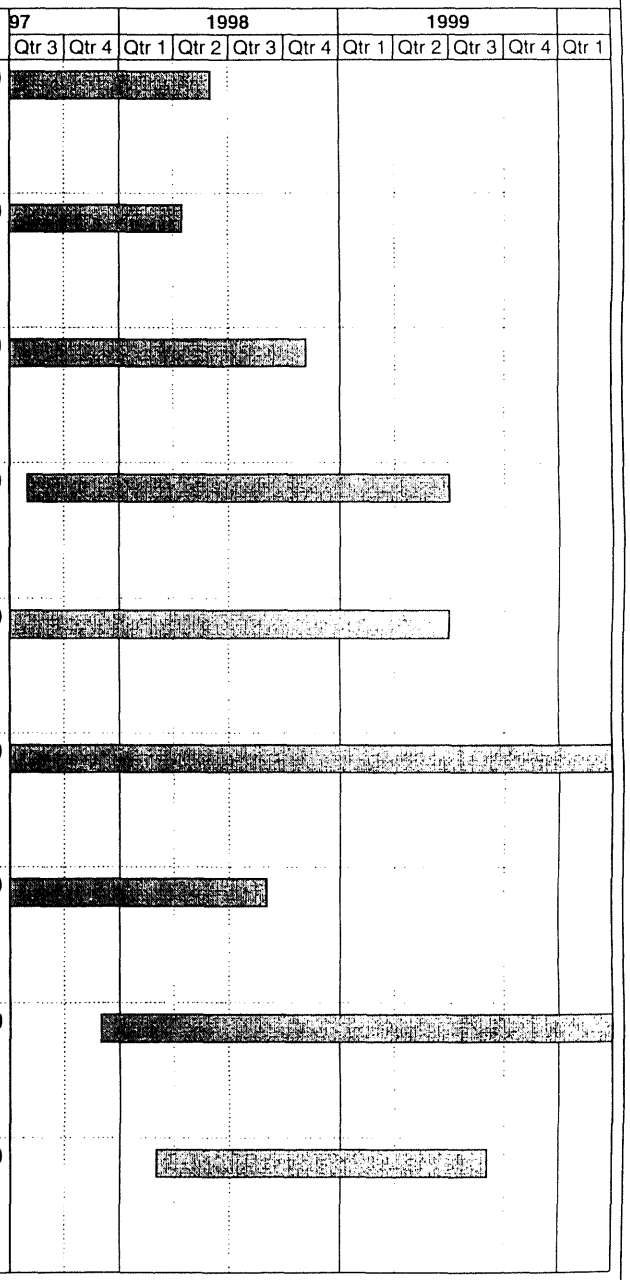
ID	Strategies	Projects & Programs	Description	Resp Org	Appropriation
28	2d; 3b; 4c	Information Security	Create security policies, standards and guidelines.	OT	$0.00
29	2h; 4a	Intellectual Property	Establish information and sales systems for licensing and royalty agreements by state agencies.	OT	$0.00
30	2h; 3; 4	International Telecommunications Union (ITU)	Participate as member of state host committee and co-sponsor MN technology event during third week of 1998 ITU plenipotentiary (United Nations gathering of 184 countries that governs international telecommunications networks and services.)	Private sector; City of Mpls.	$500,000.00
31	3a, d; 5e	Internet Center	Assist local information and telecommunication technology integration by sharing best practices, and providing training and technical assistance to communities. Collaboration of state, local, federal, higher education and private sector partners.	OT	$250,000.00
32	3a, d; 5e	Internet Center Seed Grants	Award grants for community technology resource development (in conjunction with Internet Centers project).	OT	$250,000.00
33	2c, g	IRM Education and Training for State Government	Provide Information Resource Management (IRM) education and training to state agency personnel.	OT	$0.00
34	1g; 3a	ISEEK	Career planning system to match industry hiring needs with students of all ages. This program will directly link Minnesota's business community with the state's higher education institutions.	MnSCU; U of MN	$2,000,000.00
35	2a, e	IT Budget	Develop criteria for systems development activities and recommendations for IT projects to be funded during the next biennium and planning estimates for an additional two bienniums.	OT	$0.00
36	2c, e, g	IT Evaluation for state government	Establish procedures for evaluating information and communication activities proposed by state agencies.	OT	$0.00



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Statewide Information and Communica. .n Technology Projects and Programs

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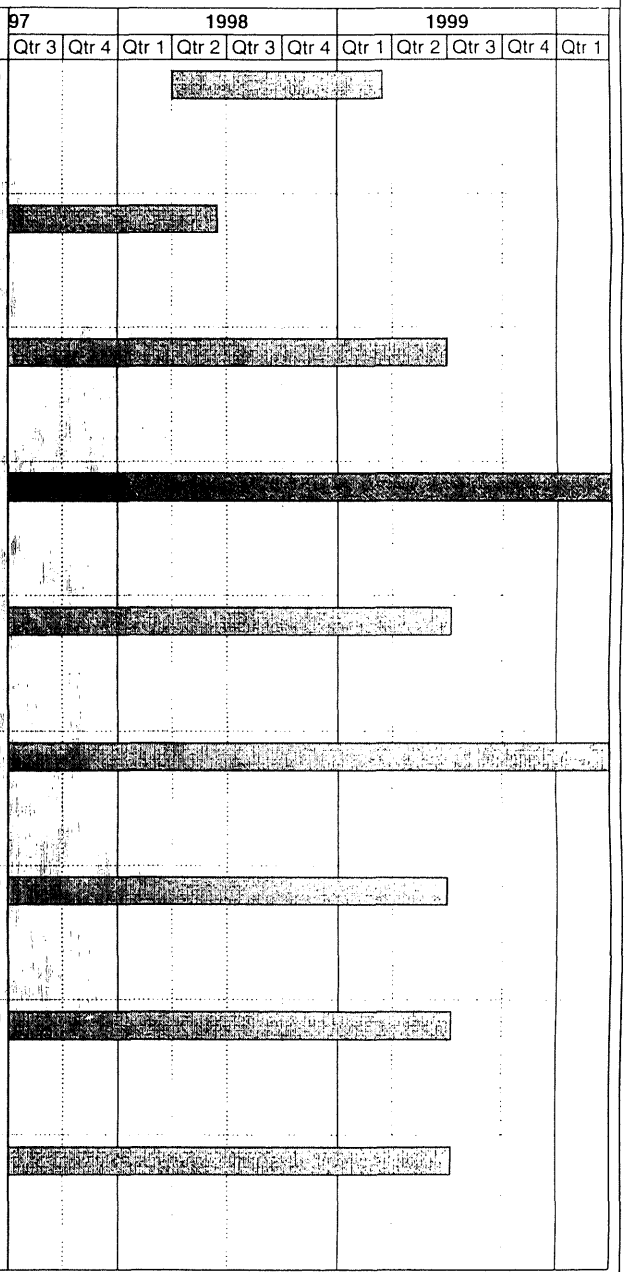
ID	Strategies	Projects & Programs	Description	Resp Org	Appropriation
37	1a, c, d	Learning Academy	Partnership of the state, local school districts and private vendors to offer courses in technology applications for teachers, with an emphasis on the integration of technology into the classroom learning process.	CFL	$2,000,000.00
38	1c; 3a	Learning Network of Minnesota	Complete and operate the K-12 and Library Learning Network. Enhance the post-secondary network, including the development of a high speed GigaPOP gateway at the U of M.	METC; CFL; HESO	$27,000,000.00
39	3a	Library Technology Site Grants	Challenge grants for libraries for technology equipment, networks and training.	CFL	$3,500,000.00
40	1e, 1f; 5c, e, g	Media Education (Arts)	Joint effort between higher education and the private sector to evaluate current training trends for film, video, and media technology. Includes credit transfer agreements and common student access to information about available arts education.	Higher education and private sector	$0.00
41	5f, g	Minnesota Guidestar Project	Shape a better transportation system through leadership in technology testing and development, institutional progressiveness and innovative partnerships (federal funding). MnDOT has committed $20,000,000 to this project.	MnDOT	$0.00
42	2g	MNet Consultation	Partner with Admin. on MNet policy.	Admin.	$0.00
43	2b; 3a, d	MnLink	Statewide network to link Minnesota's public, school, academic and private libraries, and the first phase of a new automated library "System X" to replace several library systems.	Higher Education Services Office (HESO)	$12,000,000.00
44	1d; 2b	MnSCU Electronic Academy	Online multimedia academic and automated student service initiative.	MnSCU	$10,500,000.00
45	2a, b, c, d, f, g, h; 3a, d	North Star II	Transition the state's "single window" online access government information system to a transactional and interactive database. North Star II will improve access to state/local government information and services for Minnesota's residents and businesses.	OT	$935,000.00



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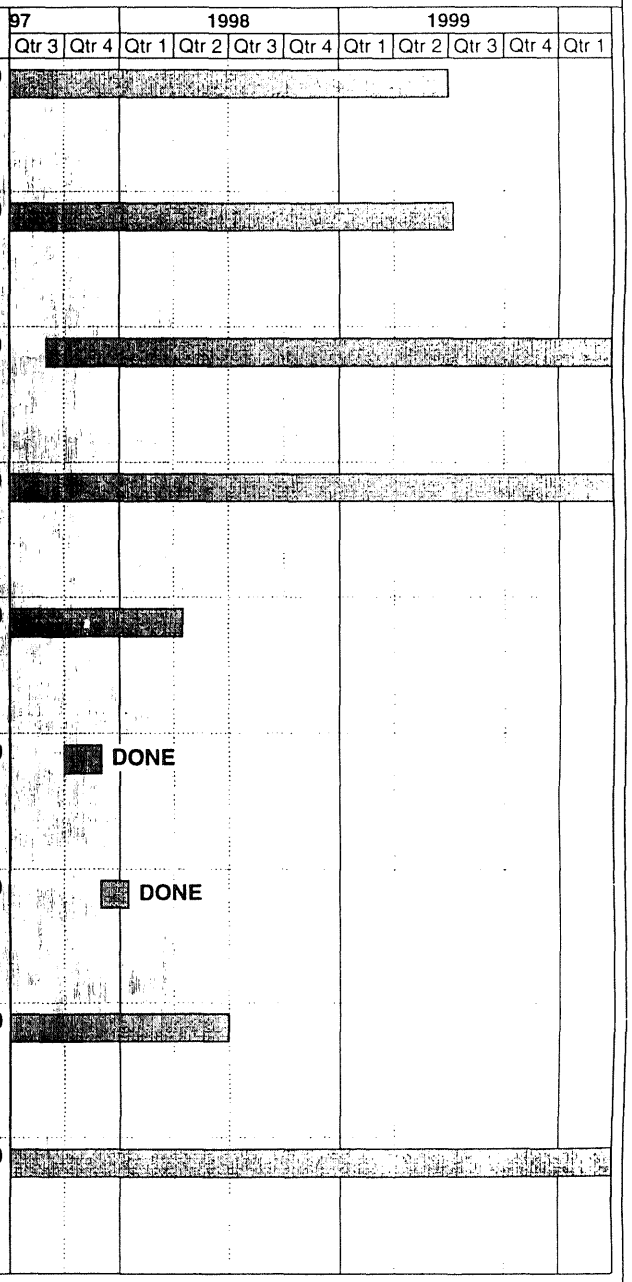
Statewide Information and Communication Technology Projects and Programs DRAFT

ID	Strategies	Projects & Programs	Description	Resp Org	Appropriation
46	2a, b, f; 3a, e; 5g	One-Stop Business Services	Develop the initial online components of a comprehensive system to link the separate operations of multiple state agencies to provide a single, coordinated access point for companies doing business with the state.	OT (for $$); DTED (for project)	$500,000.00
47	2b; 3d	Online Journal Access	Access to online science and technology journals. Also see MnLink.	Minnitex (HESO)	$1,000,000.00
48	4d	Private Sector Incentives	Facilitate partnerships and policies to promote private sector information & communications investments (e.g., partnership w/ MnDOT & Center for Transportation Studies on capacity issues & tax/regulatory policy devices to encourage business development.	OT	$0.00
49	2c, g	Process Improvement for IT (State Government)	Strategies and methods for improving systems development, and for establishing continuous process improvement programs, applicable to the development and management of information resources.	OT	$0.00
50	2a, b, g, h	Procurement Reform/Practices	1998 legislative initiative to increase agency authority for local purchasing, application of best value criteria and streamline purchasing process with electronic commerce.	Admin.	$0.00
51	2a, f, g	Report on State Agency Systems Inventory	Report due to Legislature (statutory requirement for OT)	OT	$0.00
52	2g	Report on Status of Eliminating Redundant Data Storage in Minnesota Government	Annual report due to Legislature (statutory requirement for OT)	OT	$0.00
53	1d; 3a	School Technology Site Grants	Challenge grants for K-12 schools to invest in technology equipment, networks and training to help change the learning process. Grants will be tied to measurable learner outcomes, and used to benefit the entire community.	CFL	$14,000,000.00
54	2d	Standards and Guidelines Development	Establish standards and guidelines for information and communications systems in state government.	OT	$0.00



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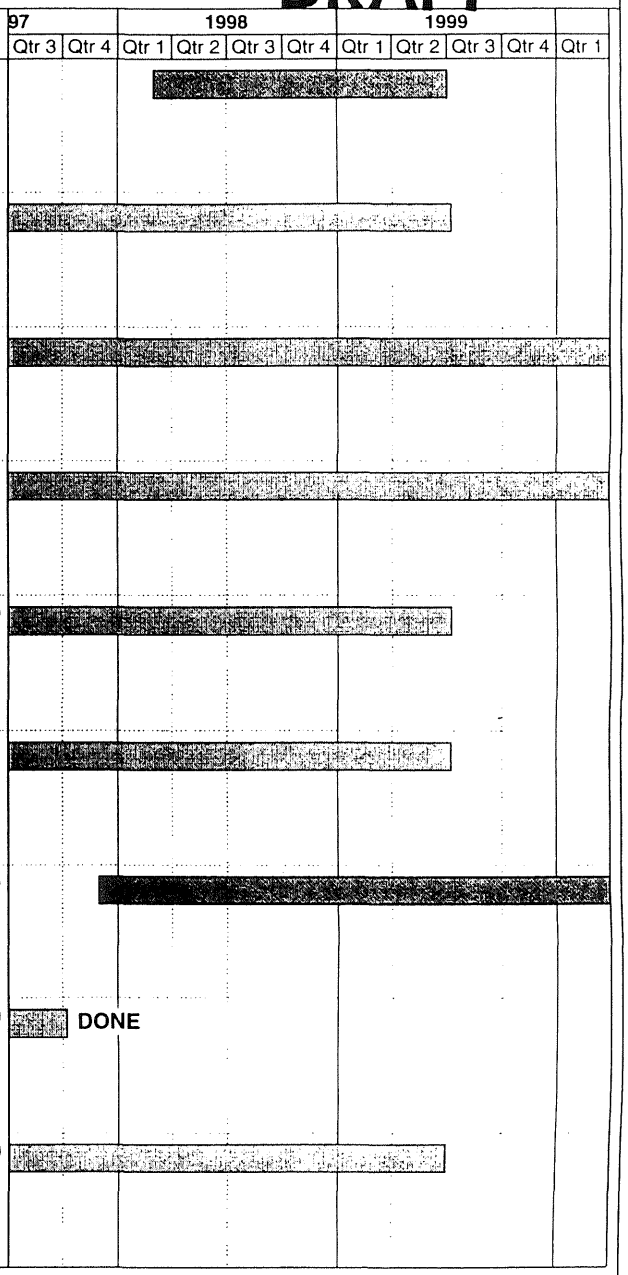
Statewide Information and Communic. .n Technology Projects and Programs DRAF.

ID	Strategies	Projects & Programs	Description	Resp Org	Appropriation
55	1d; 5c	Technology and Music Summer Camp	Integrate rural and urban youth through Internet communications focused on common musical interests. Develop music skills in participating students through annual summer camps.		$0.00
56	2a, b, g	Telecommunications Collaboration Project	Aggregate state agency demand for connections to county offices. Promote state participation in local community and regional telecommunications networks to improve access to advanced services and lower costs to residents and businesses.	Admin. and Internet Center and IPC	$1,660,000.00
57	2a, b, f, g	Telecommuting/ Telework Program	Monitor and assess state agency telecommuting/telework plans. Promote telecommuting/telework in state government.	OT	$0.00
58	4b; 5a, b, g	Telemedicine Program	Faciliate development of telemedicine projects to increase access to health care throughout Minnesota.	OT	$0.00
59	3a; 4a, d	Trade Point Minnesota	Center for U.N. global network serving trade, distance learning & telemedicine. Public-private venture to benefit businesses thru international Internet-based electronic trading gateway. SEAL lab/hub at U of M for secure authenticated electronic commerce.	OT and U of M	$1,300,000.00
60	1c; 3a	Transition to Digital TV (formerly "High Definition TV")	Develop a statewide digital broadcast system, with emphasis on educational applications and public affairs.	MN Public TV Assoc.	$750,000.00
61	4b; 5c, e	Universal Resource Locator for the Arts	Joint effort to organize art web sites in Minnesota.	DTED, State Arts Board, non-profit arts groups	$0.00
62	4b, c, d	University of Minnesota Digital Summit	Conference on technology.	U of M	$0.00
63	1c; 2b; 3e	Virtual U	Develop virtual learning infrastructure for U of M, MnSCU and private college partnership to provide single "front door." Improve access to higher education, facilitate cooperative programs, & open global markets for the state's colleges and universities.	U of M; MnSCU	$1,160,000.00



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64	2a, b, f, g; 3a, f	Wireless Technology	Negotiation of wireless deployment in Connecting Minnesota contract by 4/30/98.	Admin.	$0.00											
65	2g	Year 2000 Project	Convert state computer systems to recognize dates beyond this century. ($23M in '98/99; $5M requested in '99)	Admin.	$28,000,000.00											

NOTE: Programs are defined as ongoing efforts that do not have established end dates.

Partial Inventory of Documents, Studies and Research on Information Resources, Technologies and Information Technology Investments

State of Minnesota White Papers, Studies and Documents (to be aligned with, but not duplicated by, the Master Plan)

"A Business Model of Minnesota Government", James Corcoran and Joel Oliver, October 28, 1991, Department of Administration

"Final Report of the Minnesota Telefutures Study Group (MTSG) to the Minnesota Public Utilities Commission", November 19, 1993

"Keeping the Competitive Edge, Positioning Minnesota for the Future in the Global Marketplace", August 4, 1995, Minnesota High Technology Council

"Minnesota Milestones 1998", February 1998, Minnesota Planning

"1996 Minnesota State Tech Survey Report", 1996, Quality Education Data

"Report of Findings and Recommendations Regarding Telecommunications in Southwestern Minnesota", January 1997, Southwest Regional Telecommunications Task Force

"Supporting Minnesota's Information Infrastructure", June 1996, Information Infrastructure Working Group and Department of Administration

"The State Networking Report; Progress, Policies, and Partnerships Bring Internet Connectivity to K-12 Schools", Spring 1997, Southwest Educational Development Laboratory

"Transportation, Information and Communications Technology Research Initiative, Interim Report", March 1998, Hubert H. Humphrey Institute of Public Affairs

"University of Minnesota and Minnesota State Colleges and Universities Joint Report on Information Technology Expenditures", February 9, 1998

Office of Technology Legislative Reports on Information Resources

"Financing Information Technology Investments in Minnesota", November 1997

"Status of State and Intergovernmental Information and Communication Systems", (part of Initial Duties report), December 1, 1997

"Review of Information Technology Boards and Councils", (part of Initial Duties report), December 1, 1997

"A Quest for Data Quality: Eliminating Redundant Storage of Data", January 1997

Tracking & Compiling Information Technology Expenditures: An Interim Report", February, 1998

Partial Inventory of Documents, Studies and Research on Information Resources, Technologies and Information Technology Investments

General Technology Bibliography
(Topics of Interest to Minnesota's Master Plan)

"Leadership Strategies: Law, Regulation and the Internet", The Forrester Report

"Social Venture Capital for Universal Electronic Communications: A Conference Report", April 24-25, 1997, The Aspen Institute

"Trends in Advanced Manufacturing Technology", March 5, 1998, Robert Benson, Minnesota Technology, Inc.

Policies, Standards and Guidelines
(Issued by the Office of Technology)

Policies:
- Information Resource Management Policies

Standards:
- Information Resource Management Standards
- Imaging Standards
- GIS Standards

Guidelines:
- Information Resource Management Guidelines
- Imaging Guidelines
- Metadata Guidelines (GIS)

Inventories

Partial list of in-process IRM and information technology projects (1997-1998) – Minnesota Office of Technology

State of Minnesota Systems Inventory (1997) - Minnesota Office of Technology

Twin Cities Arts Organizations

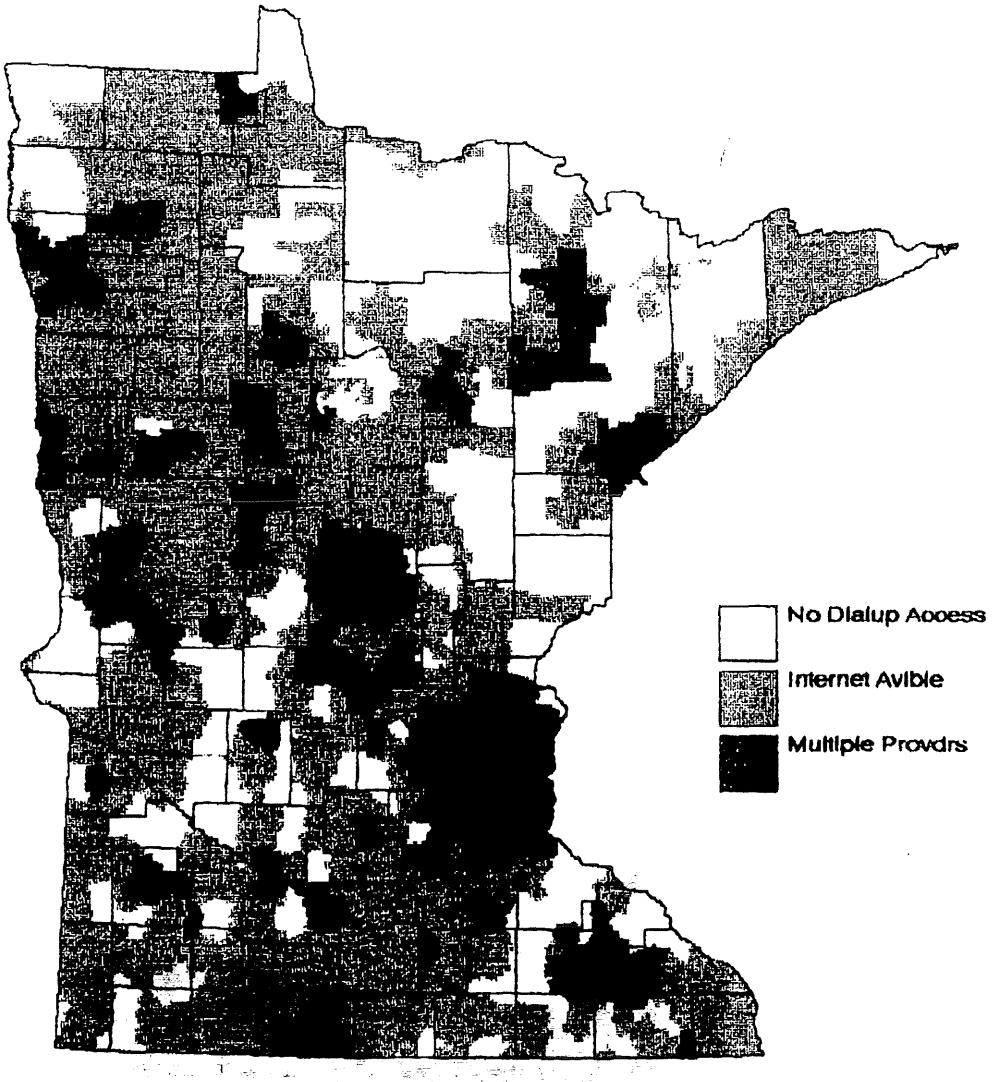
Year 2000 Inventory (hardware and software) (1996) - Department of Administration

Information Resource Models (multi-organizational)

Criminal Justice community data model

Metro GIS data model

Internet Coverage



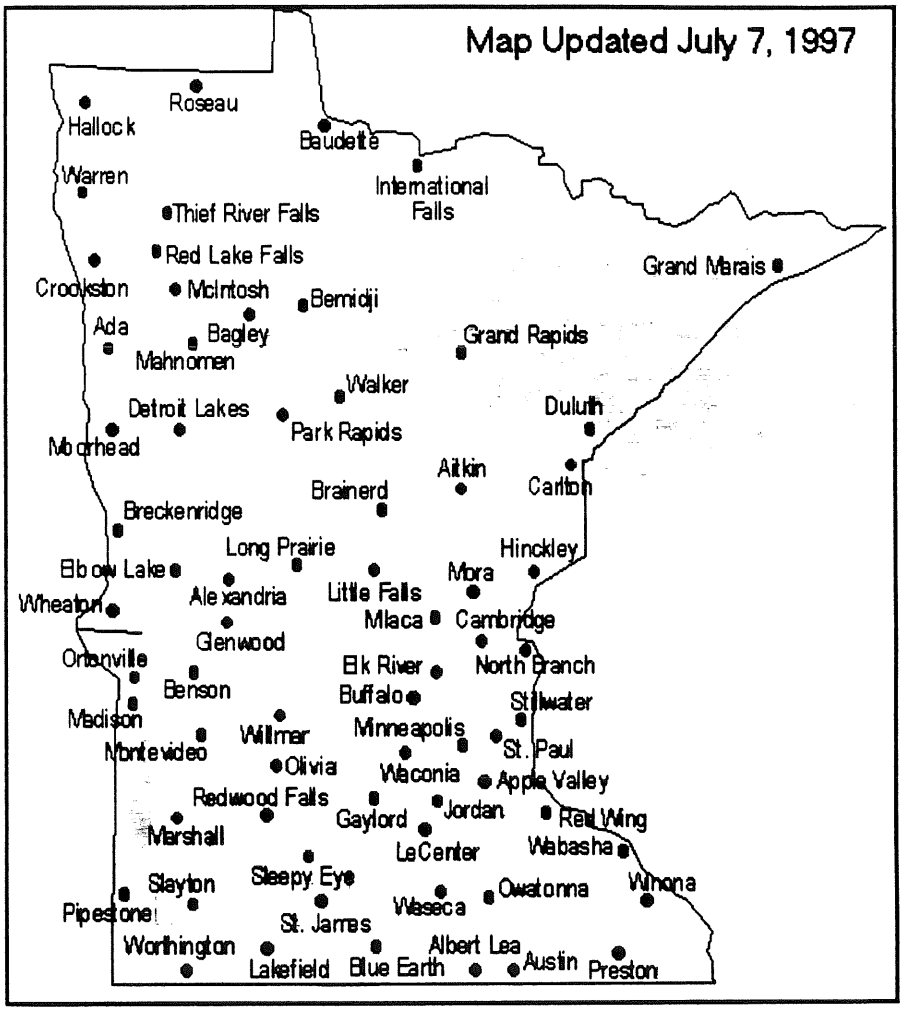
DATANET PLUS MAPPING

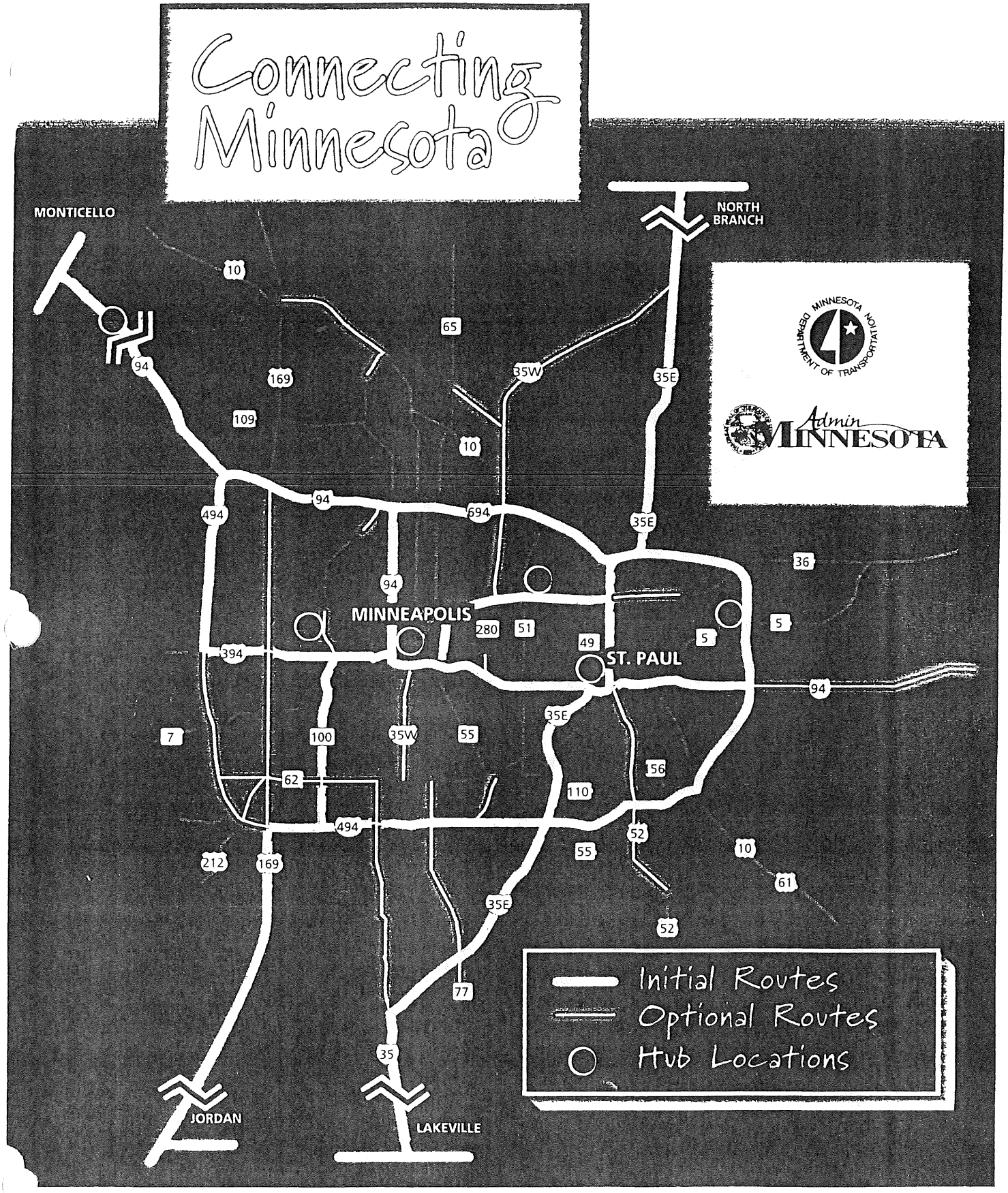
Internet Providers within County Lines

ACCESS MINNESOTA SITES

Click here for a text listing of the sites

For links to all of our Extension Office home pages, please visit our Extension Offices page




Connecting Minnesota
MONTICELLO
NORTH BRANCH
MINNEAPOLIS
ST. PAUL
JORDAN
LAKEVILLE
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494
694
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62
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212
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77
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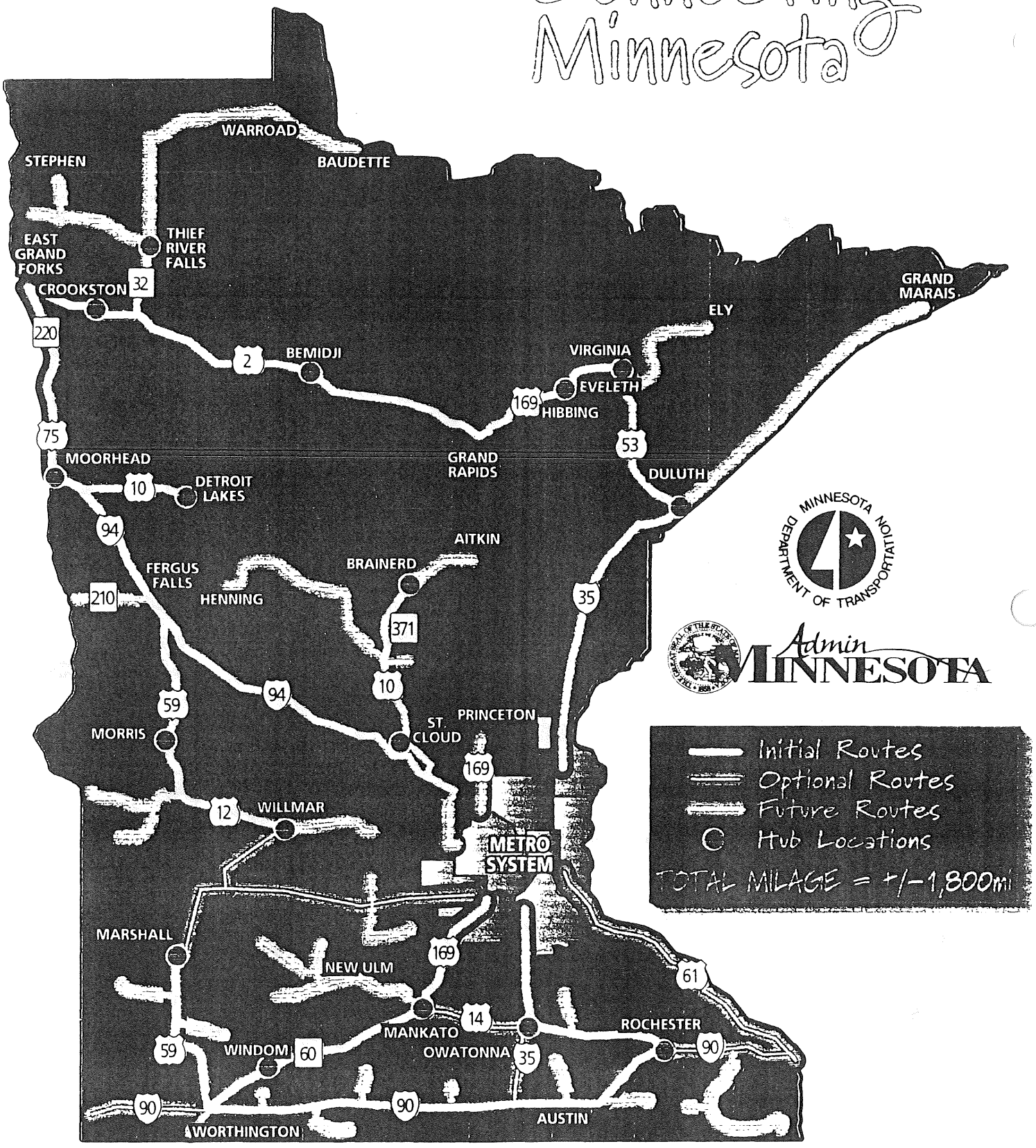
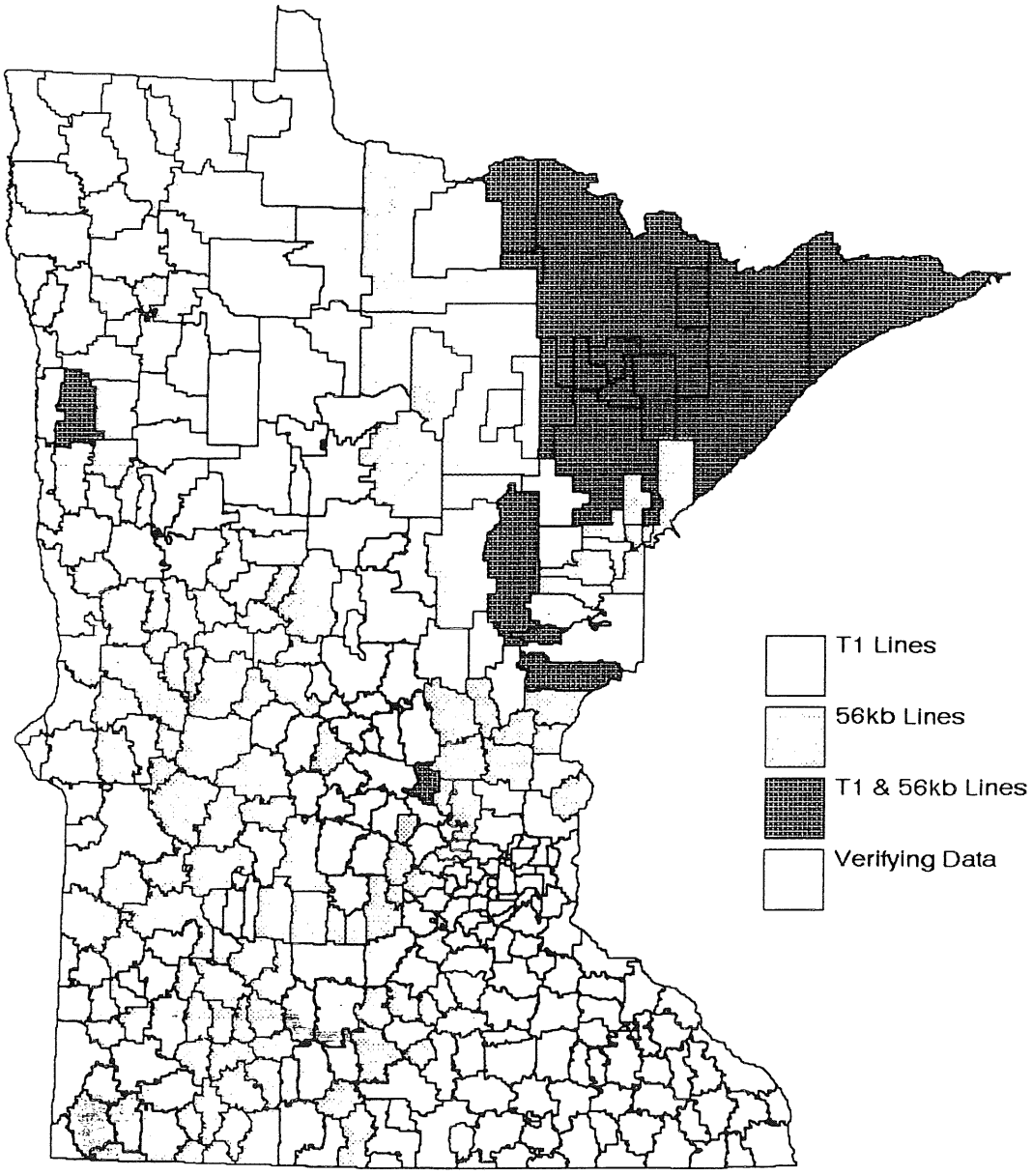
Initial Routes
Optional Routes
Hub Locations
MINNESOTA DEPARTMENT OF TRANSPORTATION
Admin MINNESOTA

Connecting Minnesota



Minnesota School Districts With Either T1 or 56kb Lines or Both



DATANET PLUS MAPPING

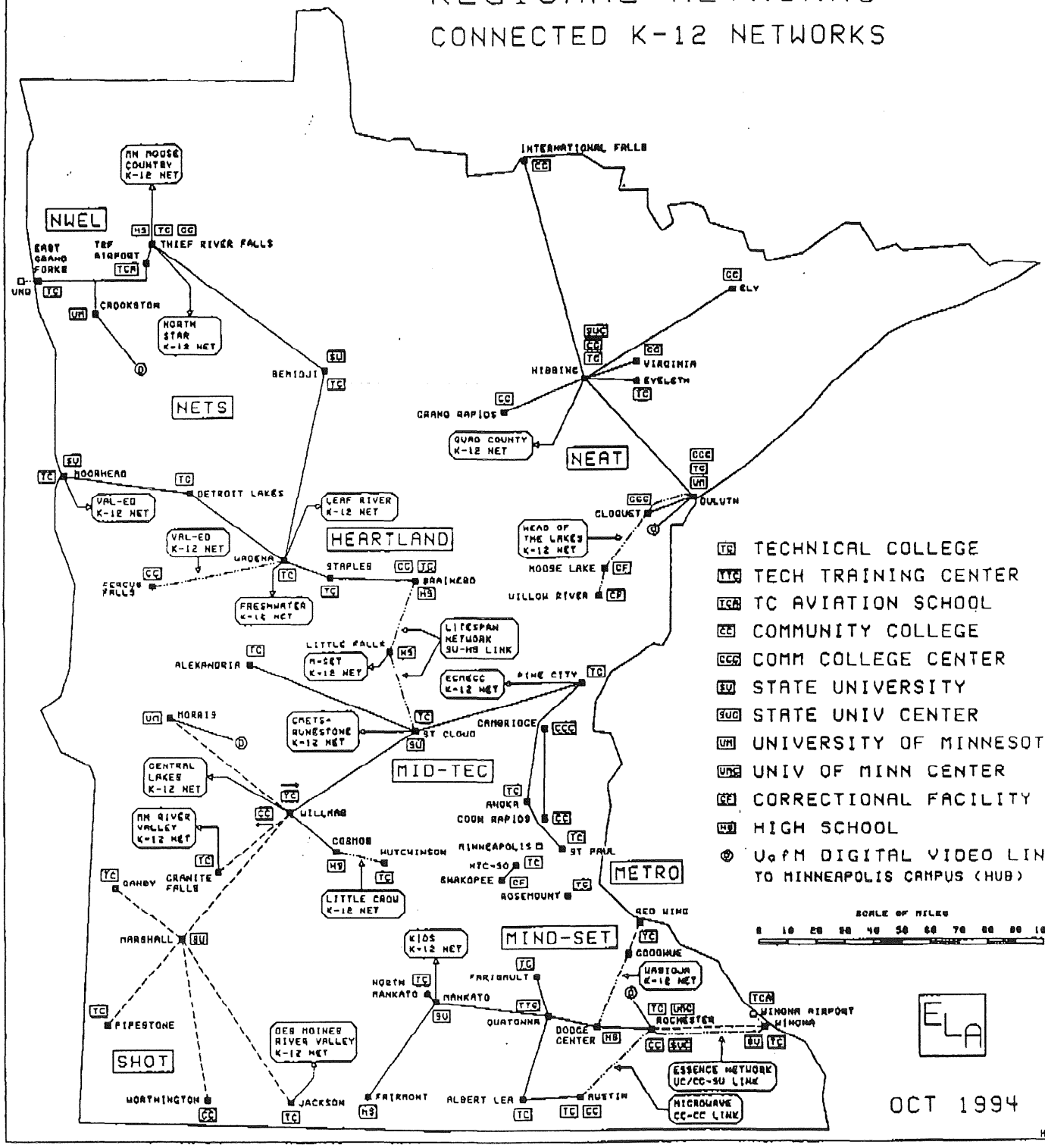
This map illustrates Minnesota's Public School Districts With Either T1 or 56kb Lines or Both - March 1998

Data Management-Office of Information Technologies

DATANET Plus™ MAPPING
LAND MANAGEMENT INFORMATION CENTER

HIGHER EDUCATION VIDEO NETWORKS

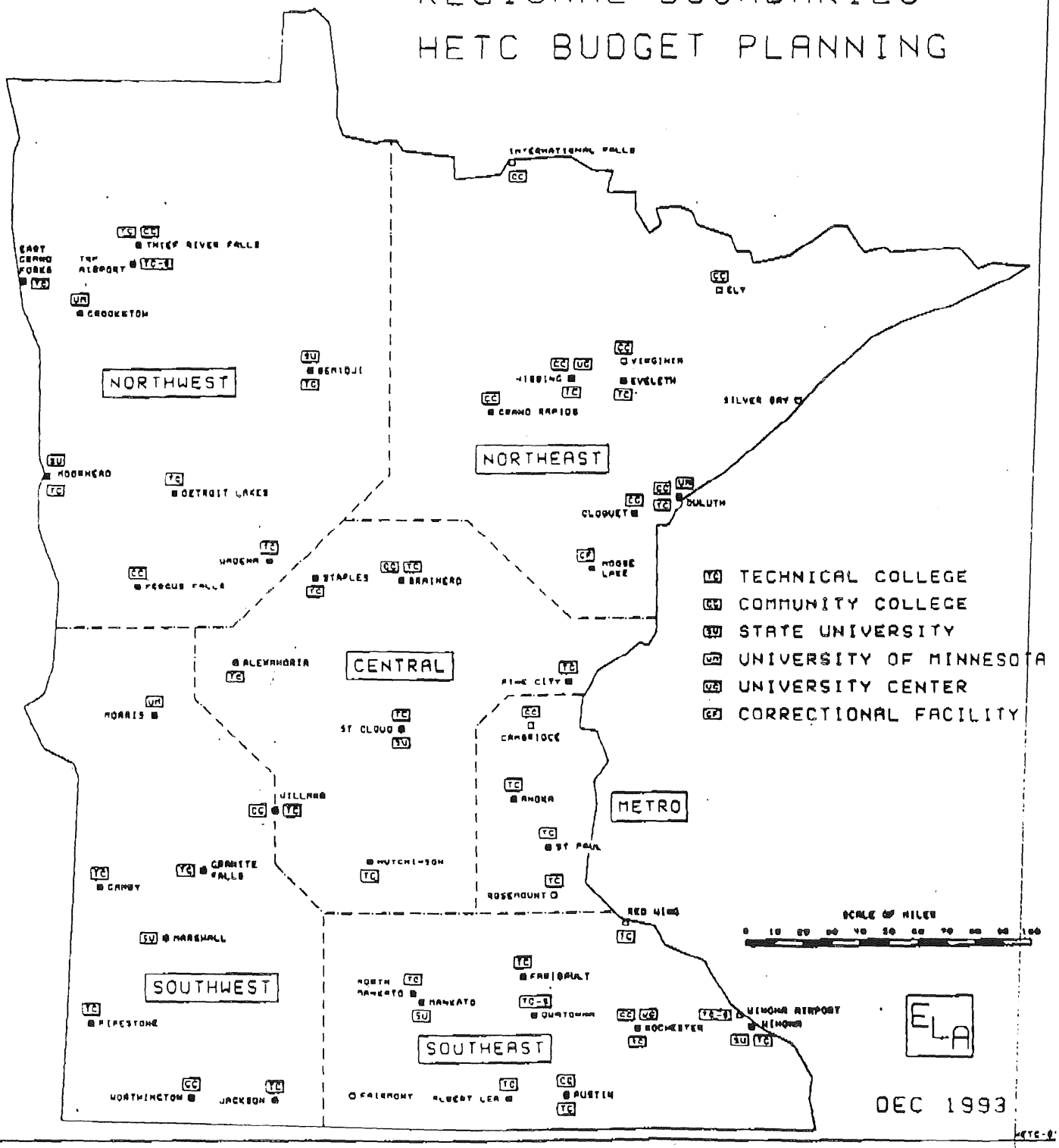
REGIONAL NETWORKS
CONNECTED K-12 NETWORKS



ED LETHERT ASSOCIATES, INC. (612) 545-0030
3656 ENSIGN AVENUE N. MINNEAPOLIS, MINNESOTA 55427

HIGHER EDUCATION VIDEO NETWORK

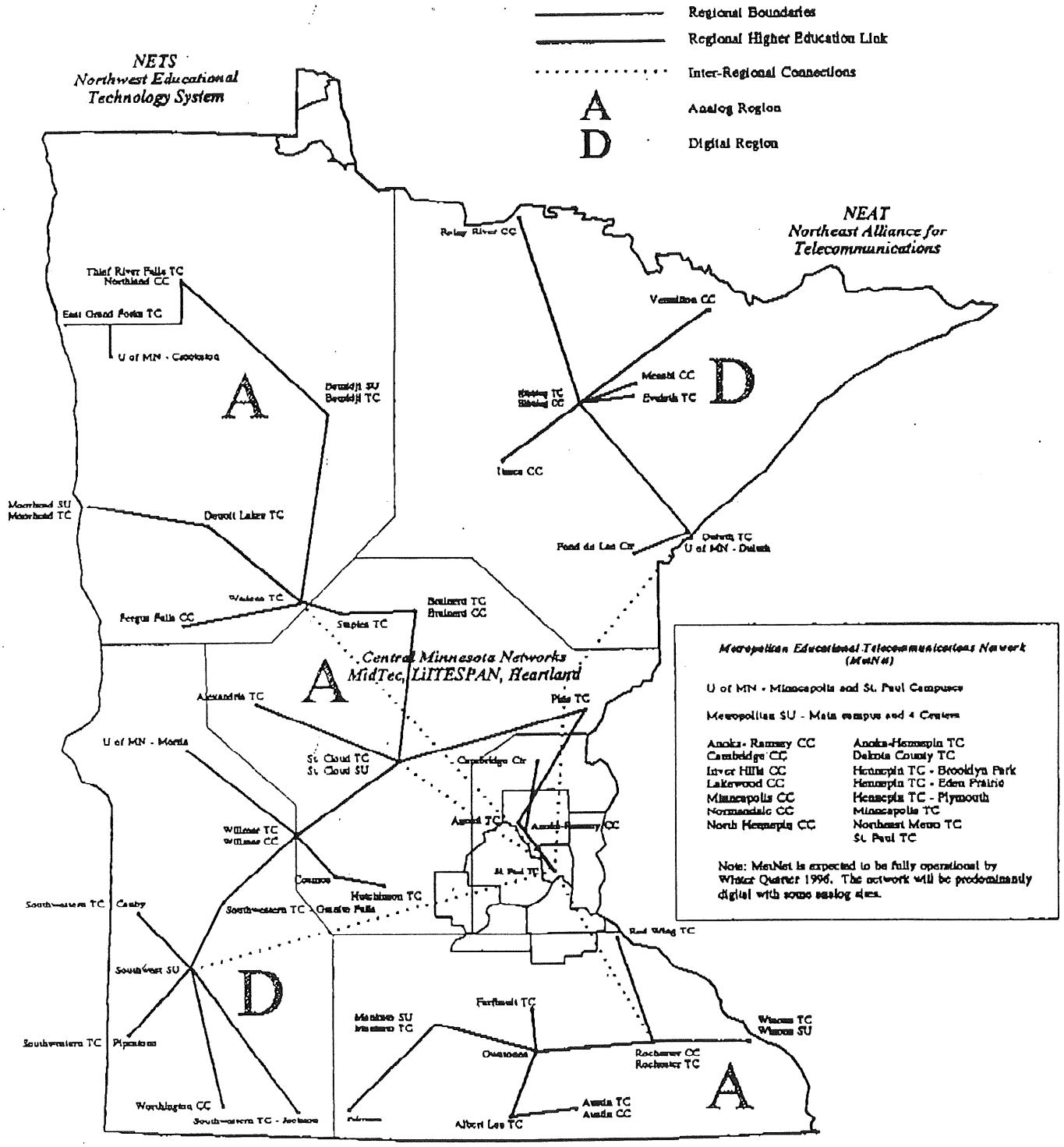
REGIONAL BOUNDARIES
HETC BUDGET PLANNING



ED LETHERT ASSOCIATES, INC. (612) 545-0030
3656 ENSIGN AVENUE N. MINNEAPOLIS, MINNESOTA 55412

LEARNING NETWORK OF MINNESOTA

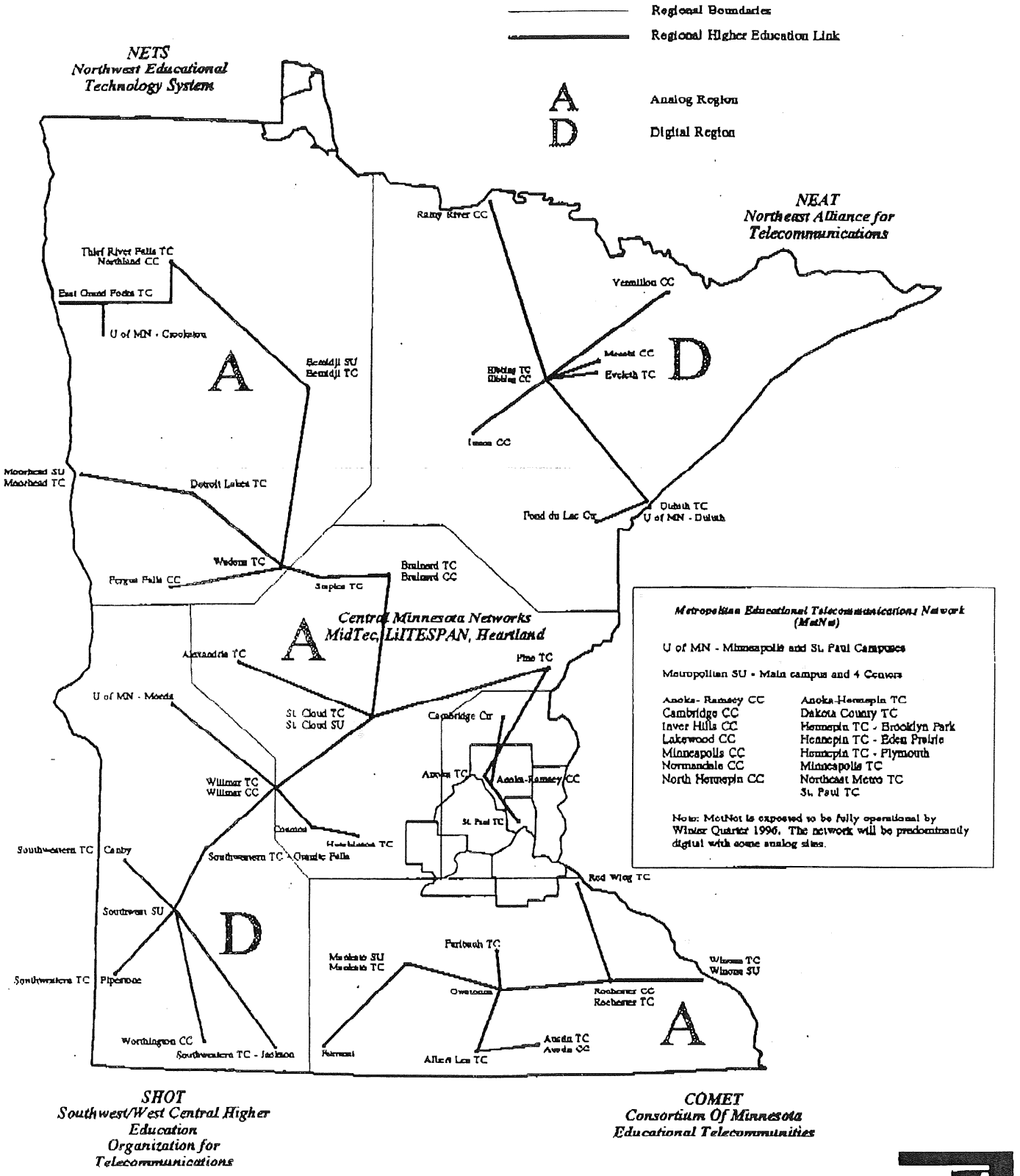
August 4, 1995



Minnesota Higher Education Services Office

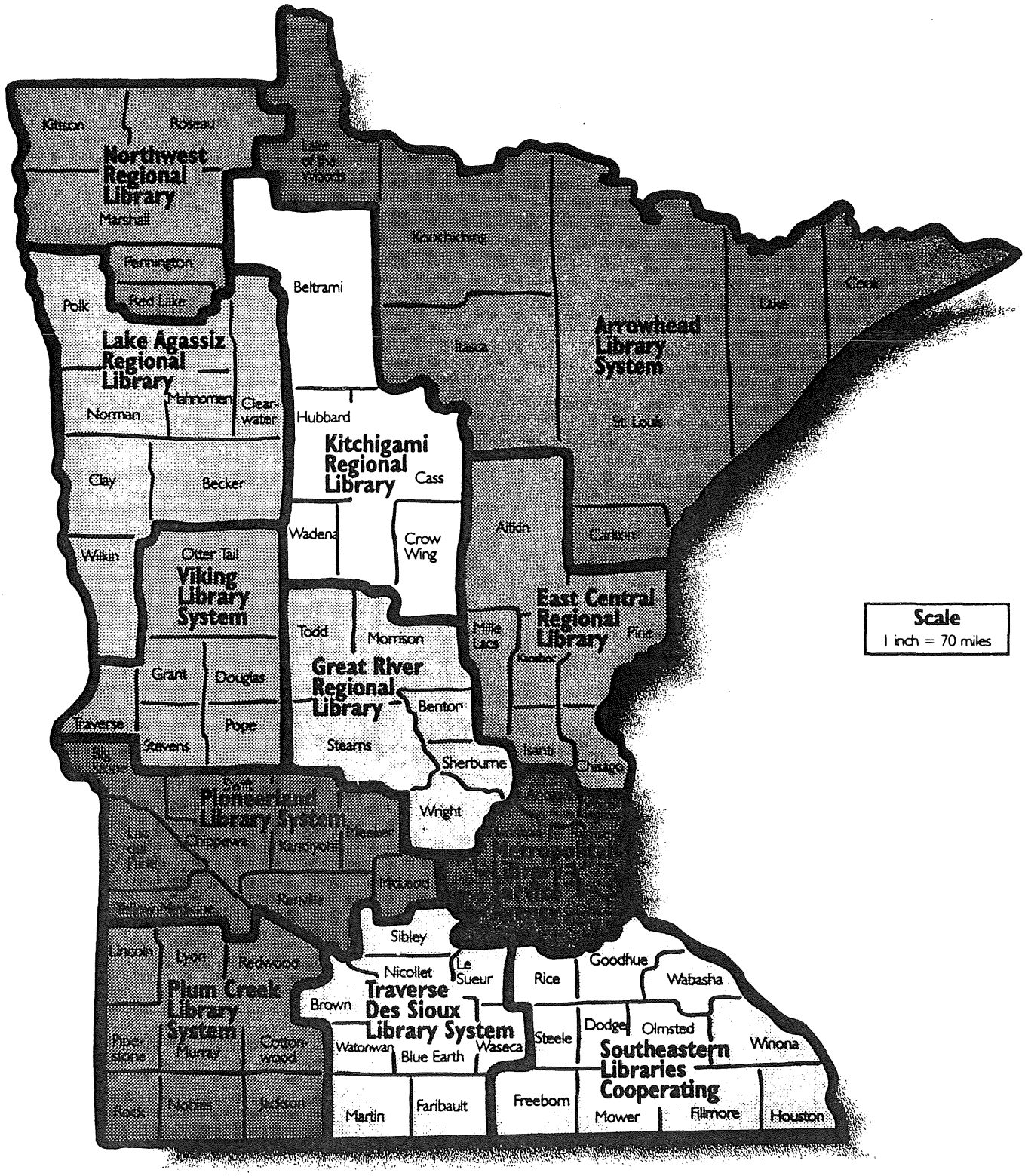
HIGHER EDUCATION NETWORKS OF MINNESOTA

October 26, 1995



Minnesota Higher Education Services Office

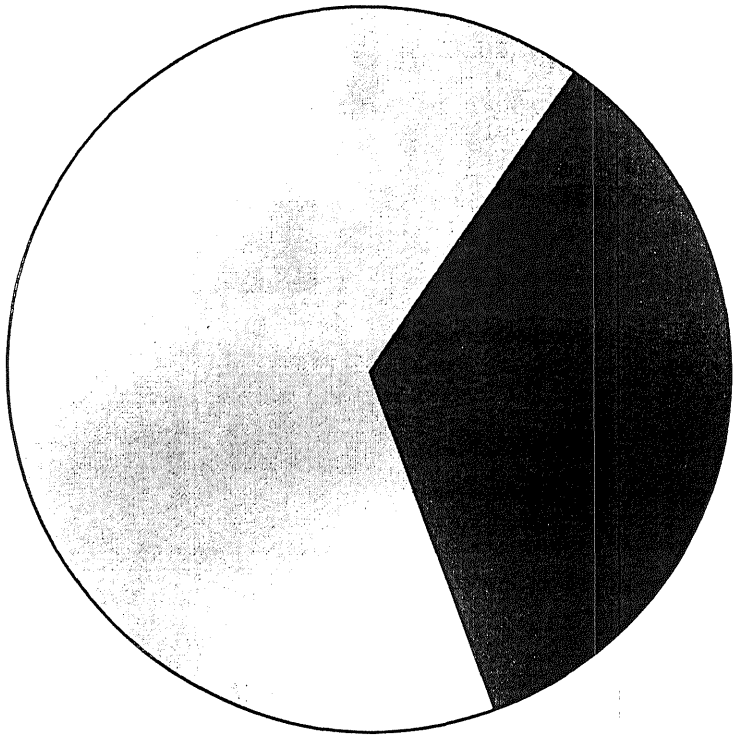
Minnesota
Regional Public Library Systems



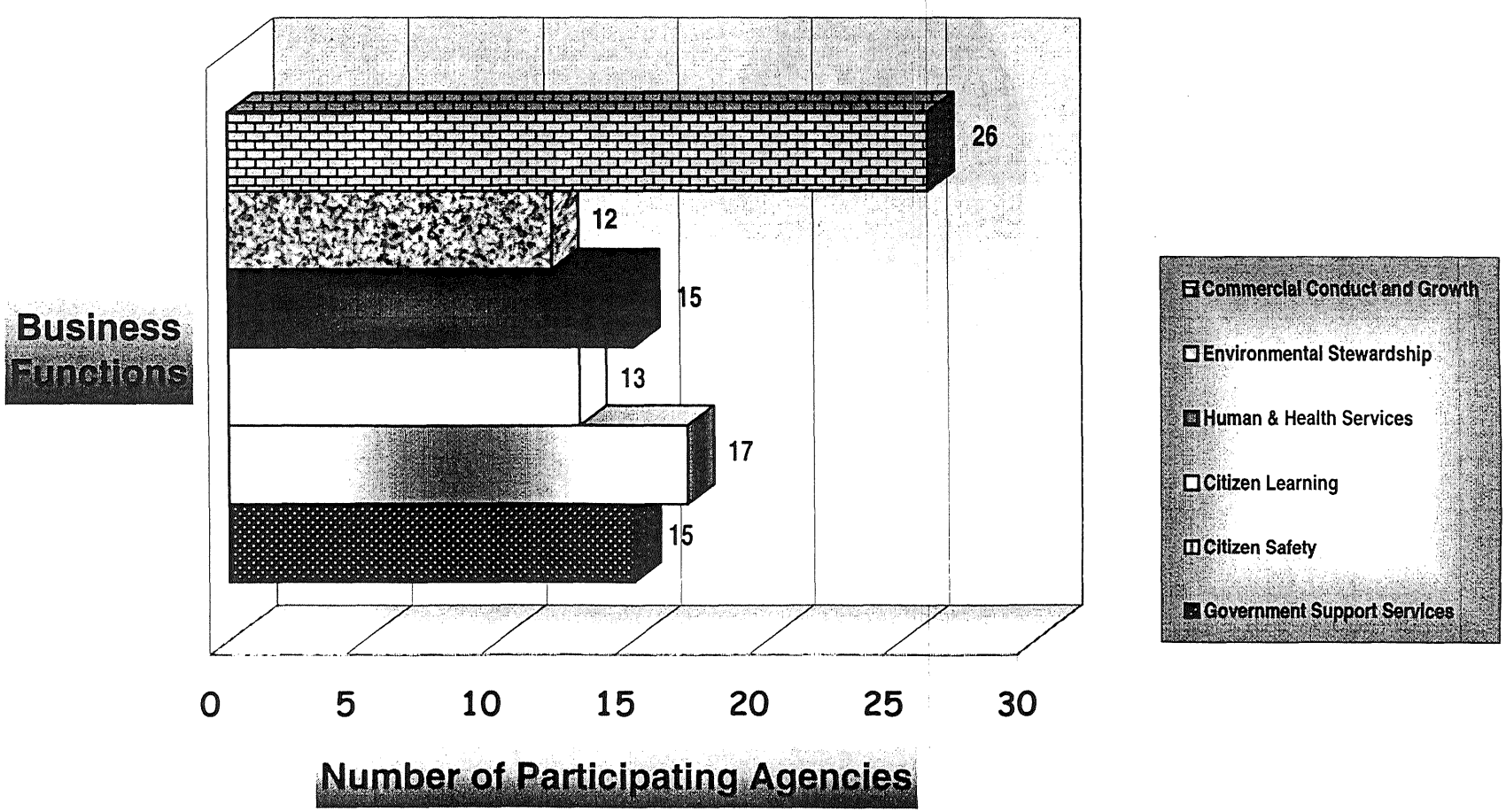
Agency CIO's - 1997

(Critical Success Factor #1: Executive Leadership)

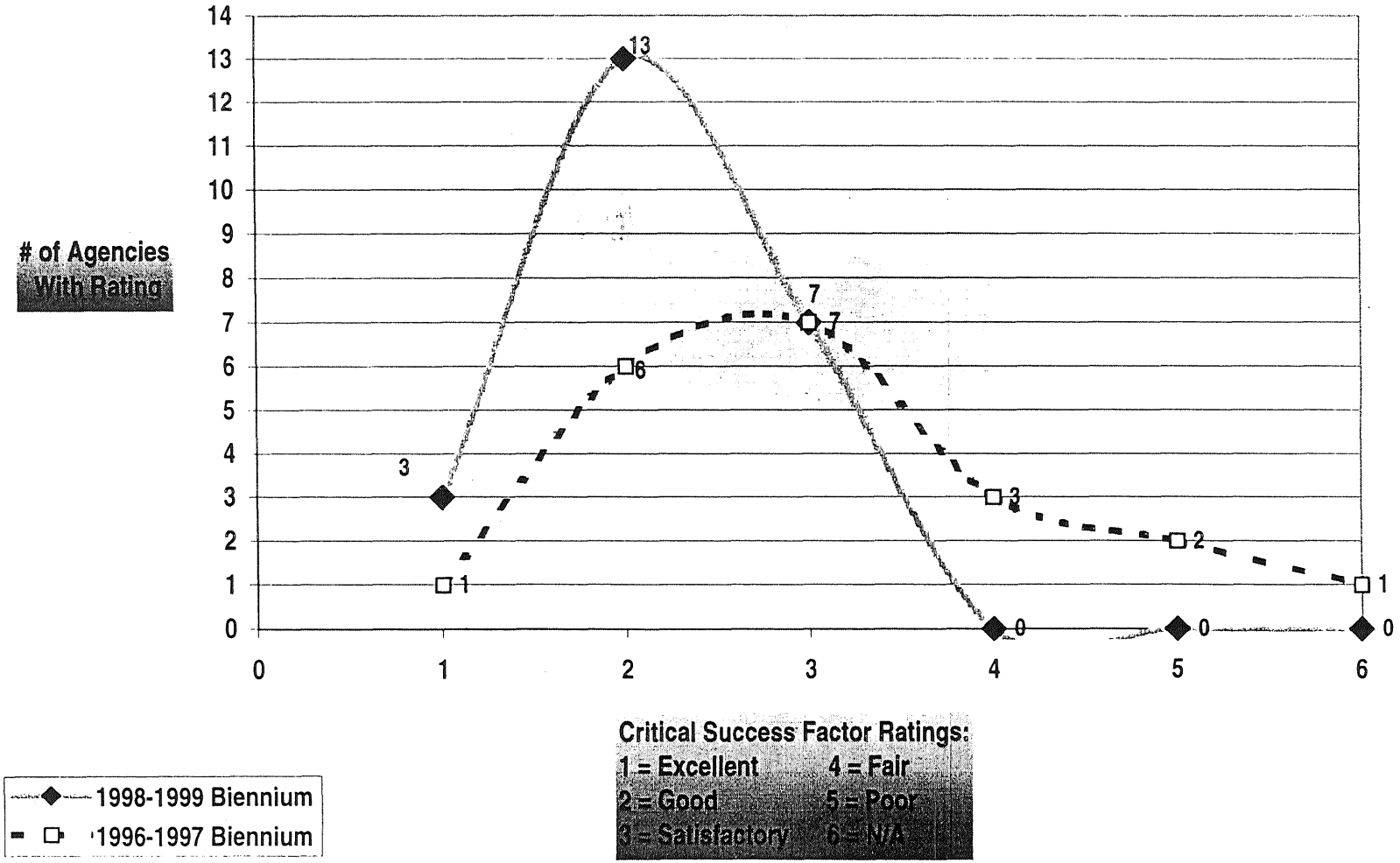
(based on 23 agencies reporting)



Business Functions of State Government
(47 agencies surveyed)



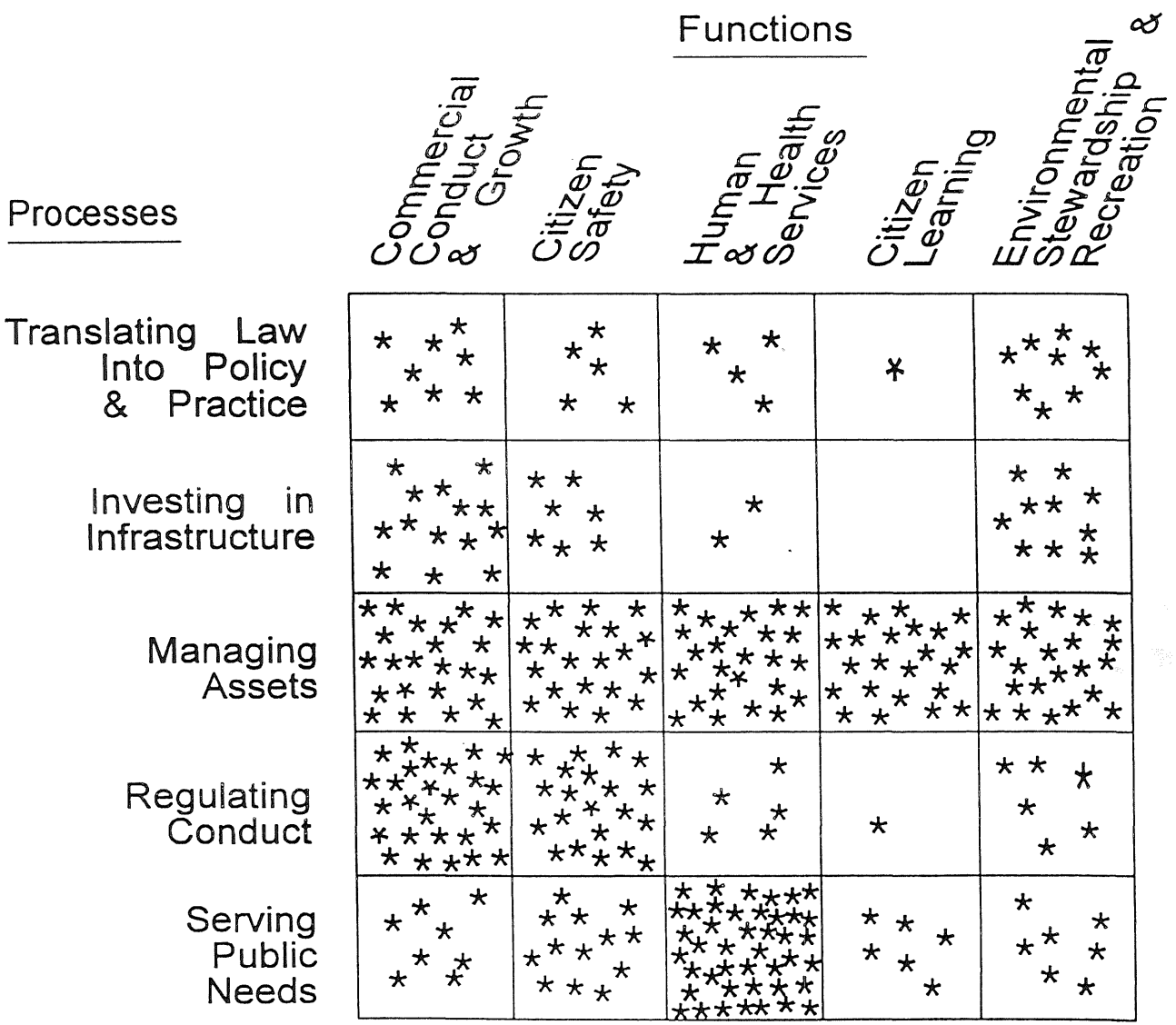
Agency Ratings for IRM Critical Success Factors

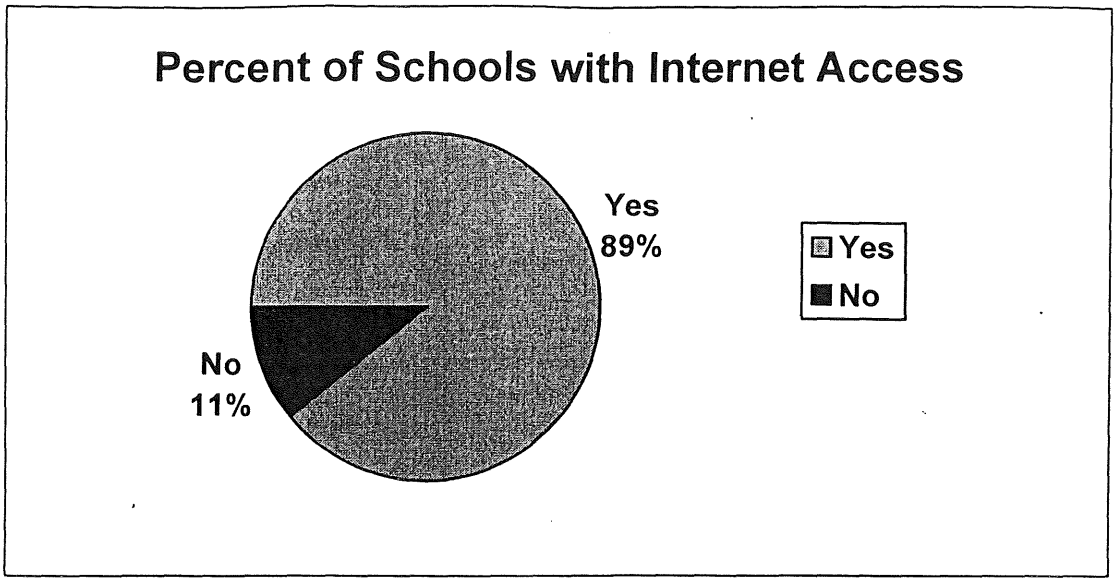


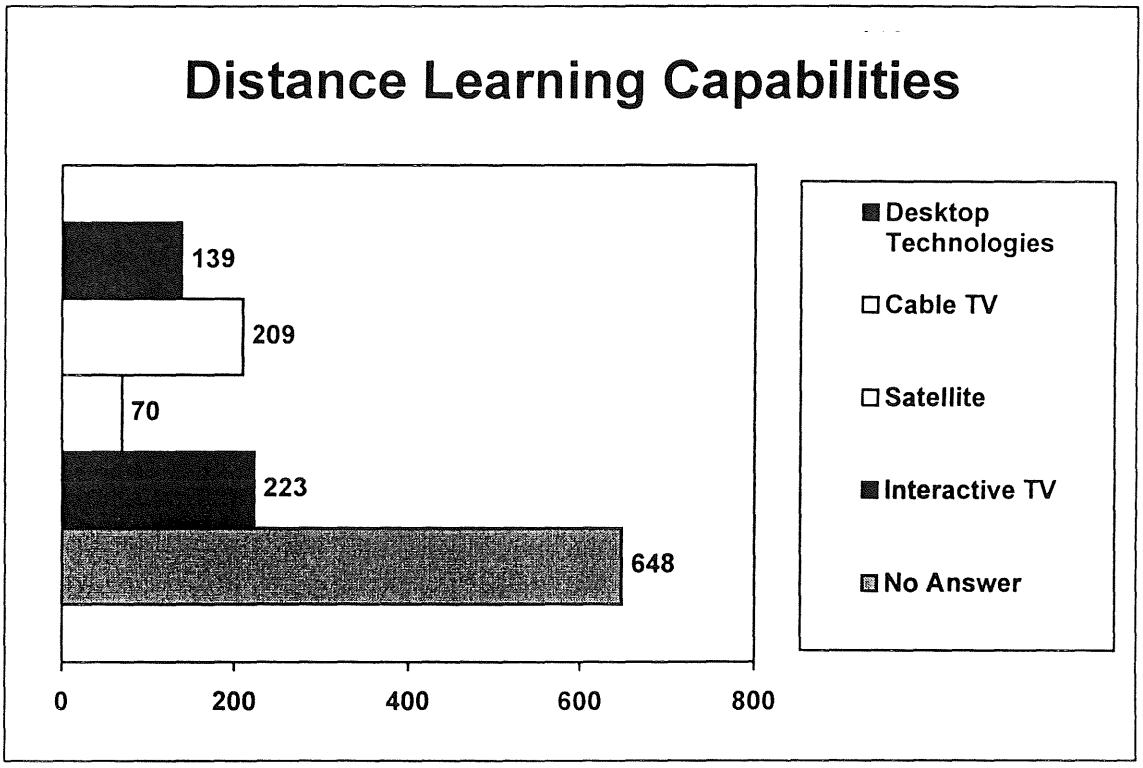
Government Organizations Work in One or More State Functions

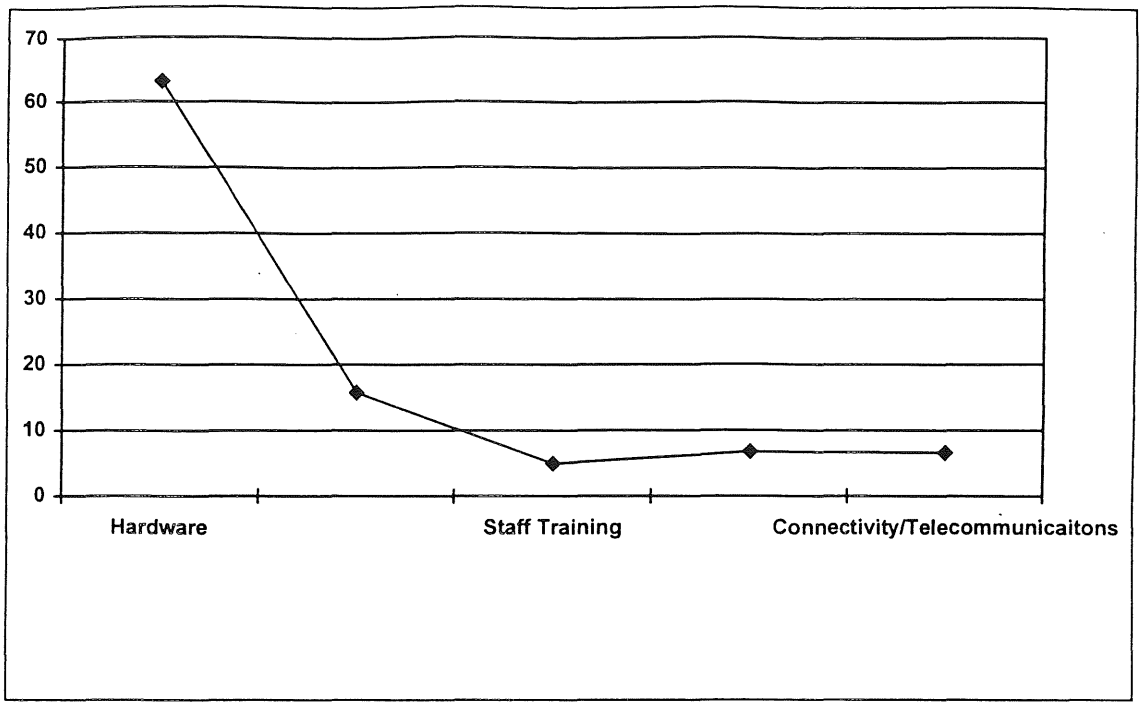
Government Organization \ State Functic	Commercial Conduct & Growth	Citizen Safety	Citizen Learning	Human & Health Services	Environmental Stewardship	Go nent Supp~rt Services
Administration Department		✓		✓		✓
Administrative Hearings Office	✓			✓		✓
Agriculture Department				✓	✓	
Arts Board			✓			
Attorney General	✓	✓				✓
Commerce Department	✓					
Community College System			✓			
Corrections Department	✓	✓		✓		
District & State Courts	✓	✓	✓	✓	✓	✓
Education Department	✓	✓	✓			✓
Education Board	✓	✓				
Employee Relations Department						✓
Finance Department						✓
Gaming Board	✓					
Greater Minnesota Corporation	✓					
Health Boards	✓					
Health Department	✓			✓		
Higher Education Coordinating Board						✓
Historical Society			✓			
Housing Finance Agency				✓		
Human Services Department	✓	✓		✓		
Jobs & Training Department	✓		✓	✓		
Labor & Industry Department	✓	✓		✓		
Legislative Auditor						✓
Local Government	✓	✓	✓	✓	✓	✓
Natural Resources Department	✓	✓			✓	
Non-health Boards	✓					
Pollution Control Agency				✓	✓	
Public Defender		✓				
Public Safety Department	✓	✓	✓		✓	
Public Service Department	✓	✓			✓	
Public Utility Commission	✓				✓	
Revenue Department	✓					✓
School Districts		✓	✓	✓		
Secretary of State	✓					✓
Sentencing Guidelines		✓				
State Auditor						✓
Strategic and Long Range Planning Office		✓				✓
State University System			✓			
Technical College System			✓			
Trade & Economic Development Department	✓					
Transportation Department	✓	✓			✓	
Treasurer's Office						✓
University of Minnesota	✓	✓	✓			
Veterans Affairs Department				✓		
Waste Management Board	✓			✓	✓	
Zoo			✓		✓	

Distribution of Major Information Systems in Minnesota Government

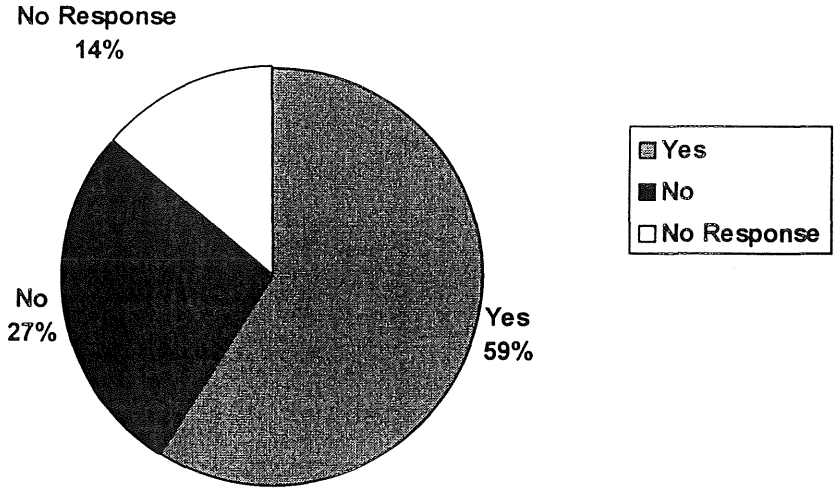


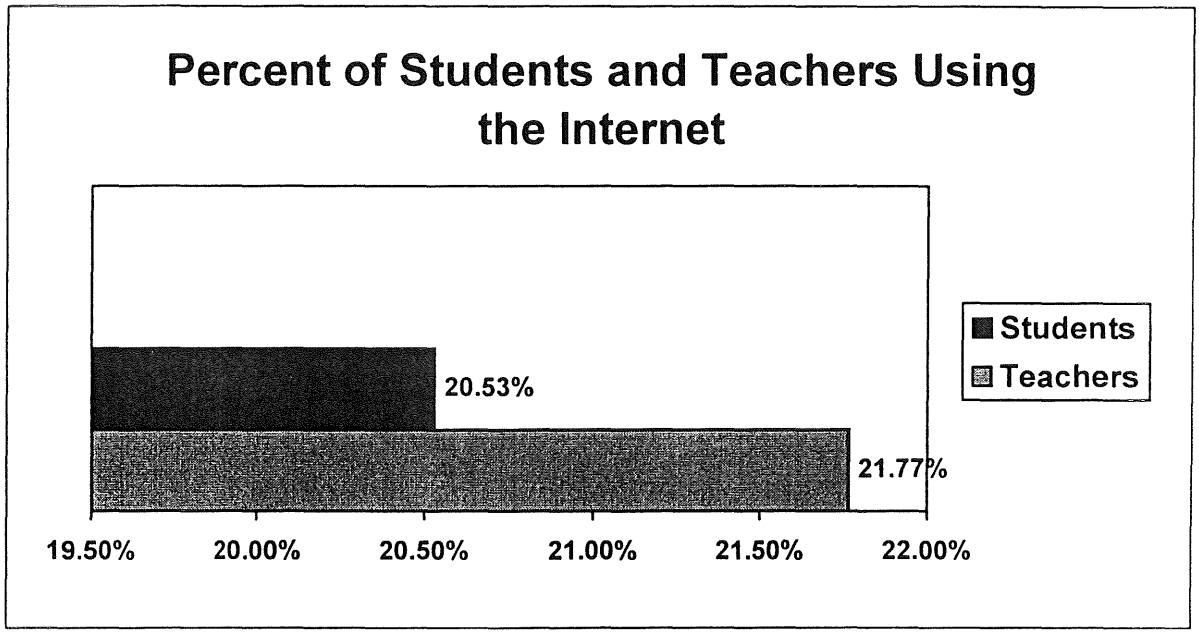

Percent of Schools with Internet Access
Yes
89%
No
11%
Yes
No

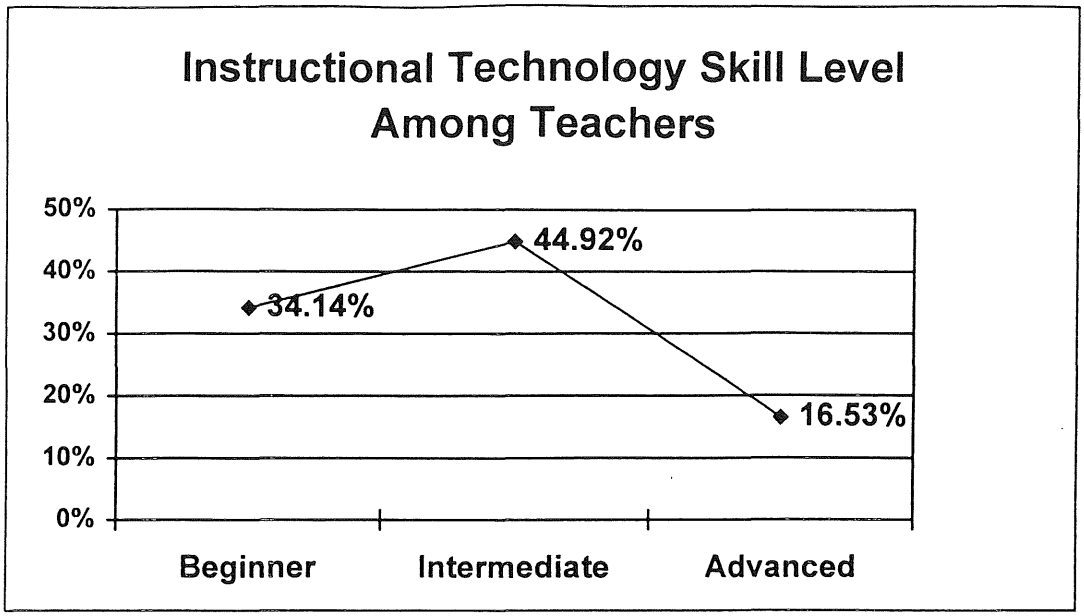

Distance Learning Capabilities
139
209
70
223
648
0
200
400
600
800
Desktop Technologies
Cable TV
Satellite
Interactive TV
No Answer



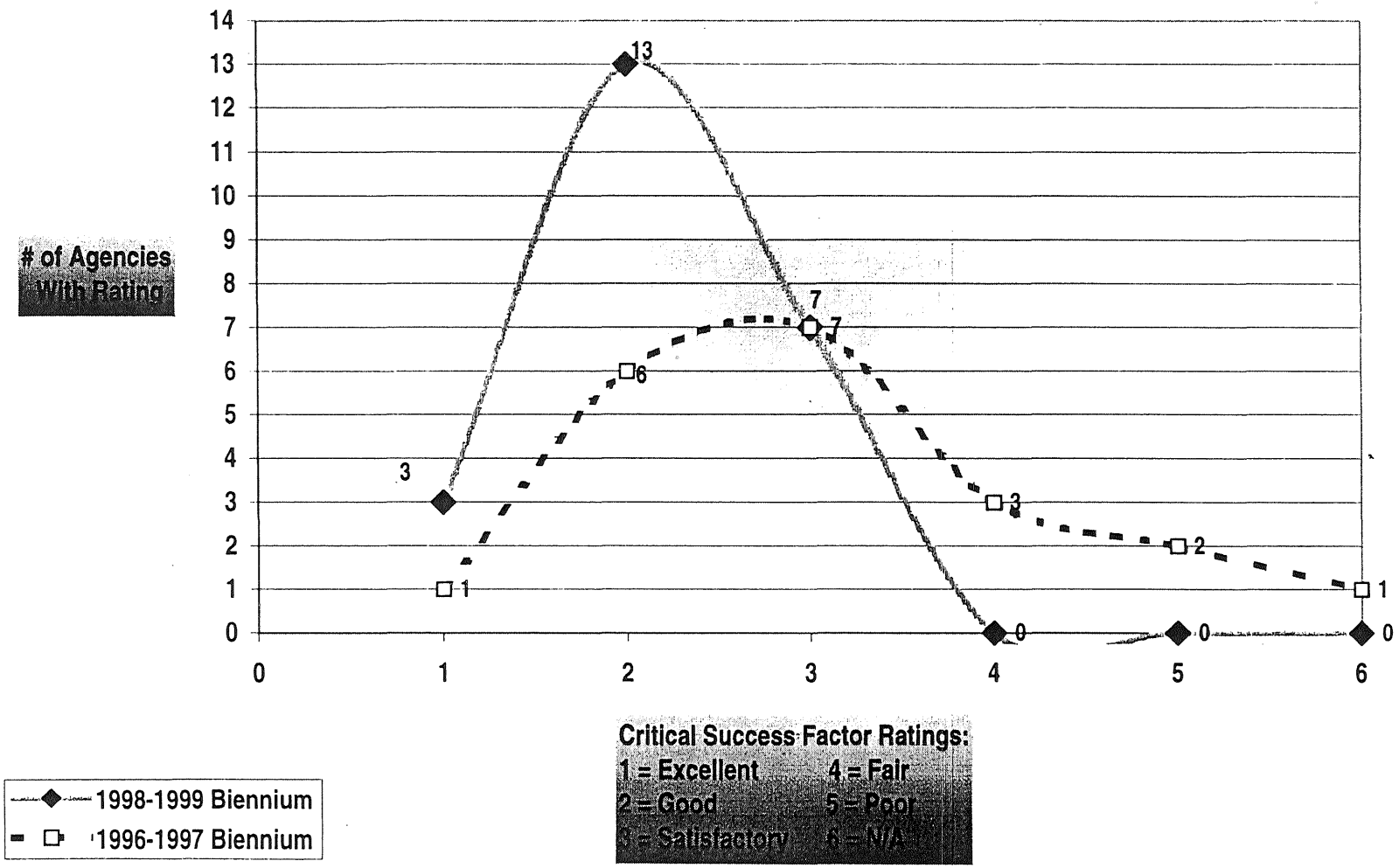
Percent of Schools with a Wide Area Network (WAN)




Percent of Students and Teachers Using the Internet
20.53%
21.77%
Students
Teachers
19.50%
20.00%
20.50%
21.00%
21.50%
22.00%


Instructional Technology Skill Level Among Teachers
50%
40%
30%
20%
10%
0%
34.14%
44.92%
16.53%
Beginner
Intermediate
Advanced

Agency Ratings for IRM Critical Success Factors



Business Functions of State Government
(47 agencies surveyed)