ND Legislative Council Interim IT Committee Research Report

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Inteliant
114 W Capitol Avenue
Bismarck, ND 58501
701.258.7072

Table of Contents

EXECUTIVE SUMMARY **3**

INTRODUCTION **5**

FINDING #1 – BEST PRACTICES FROM OTHER STATES **6**

FINDING #2 – K-12 ISSUES **10**

FINDING #3 – DISTANCE LEARNING **14**

FINDING #4 – FUNDING OPPORTUNITIES **17**

FINDING #5 – STATUS & OUTLOOK OF BROADBAND IN NORTH DAKOTA **19**

FINDING #6 – ECONOMIC DEVELOPMENT **22**

FINDING #7 – 1999 FISCAL NOTE MEASURES **26**

APPENDIX A **28**

APPENDIX B **30**

APPENDIX C **31**

APPENDIX D **34**

APPENDIX E **35**

APPENDIX F **41**

APPENDIX G **42**

Figures and Tables

Table 1 - North Dakota Broadband Access 20
Table 2 - Milken Institute Metro Rankings for High-Tech Economy 23
Table 3 - The State New Economy Index.....24

EXECUTIVE SUMMARY

The North Dakota legislative interim IT committee began studying state telecommunications in 1998. Senate Bill 2043 was passed during the 1999 legislative session establishing the Information Technology Department (ITD) and broadening network participation to include state agencies, higher education, K-12 and political subdivisions. ITD has issued an RFP for network services and associated components with proposals due on June 2, 2000.

With the passage of SB2043 (now codified as ND Century Code chapter 54-59), state government is joining forces with the university system, K-12 schools, cities and counties to purchase telecommunication services as a large buying block. This will allow the aggregation of purchasing power across the entire state. The outcome will provide savings for the network users, the deployment of more advanced network services statewide and economies of scale for network support.

The purpose of this study was to conduct research in four primary areas:

- Distance learning
- Network funding
- Economic development
- Network financial measures

While previous legislative action initiated the implementation phase of the network, the critical decisions to be made in the 2001 session will center on funding and utilization issues. The legislative body will use this study during that session as policies are determined.

The attached report provides seven primary findings. The seven findings are based on information gathered, reviewed and organized by the project team. Three of the findings deal with education, two concern economic development and the remaining two involve financial matters.

This study included a review of implementation of the telecommunication investments made in South Dakota and Wyoming. These states were selected due to the similarities in demographics and the fact considerable network advancements have been made over the last several years.

Numerous meetings were conducted with ND K-12 school representatives. Concerns regarding the network plan appear to ease as more detailed information becomes available. As ITD has continued with the implementation phase of the network the school district representatives have been able to obtain more definitive answers to questions and concerns regarding the network plan. The next challenge for the K-12 community is determining how the network can be most effectively utilized. Funding will be required to train staff and develop teaching delivery methods that optimize the new capabilities. Leadership is the key.

Distance learning utilization by K-12 and higher education/adult education systems will continue to expand rapidly in the future. As advanced network connections are available, educators will be able to utilize an incredible array of tools to advance learning opportunities in the most remote regions. The market will supply a plethora of resources that utilize the voice, video and data capabilities offered via the new network.

The economic development implications of an advanced telecommunications infrastructure require continued attention at a statewide level. The urgency for making sure ND communities have access to broadband services has increased as the legislative and executive branch leaders have more fully realized how vital these capabilities are to North Dakota's economic condition.

Some communities have begun to address the last mile issues and other local connectivity problems. Individual community efforts have obtained varying levels of success. Tremendous energy has been poured into this area in some communities as they have searched for cost-effective solutions that provide high quality services.

The state also needs to ensure regulatory issues don't create obstacles that prevent advancements for advanced networking. The telecommunications regulatory framework should encourage competition, promote affordable pricing, and provide universal access throughout the state.

Three primary areas stand out as legislative action items for the 2001 session. They are as follows:

- Support and fund the network implementation to provide connectivity to state agencies, K-12 schools, higher education, counties, and cities. This implementation will drive the deployment of advanced telecommunications capabilities throughout the state
- Establish a structure to develop the programmatic use of the network for educational purposes. The network will provide the infrastructure but programs need to be developed to insure the full value of the network is realized
- Address economic development needs by providing technology assistance and education to economic developers

INTRODUCTION

The United States is in the midst of the greatest economic expansion in history. This expansion has already created 1.2 million jobs and $301 billion in estimated Internet revenue. By 2002, the Internet is expected to save global business over $1 trillion, resulting in lower cost goods and services in all industries.

Federal Reserve Chairman Alan Greenspan now credits the expanding high-tech sector for the good economic times and changing the fundamentals of how the American economy works. "Thanks to technology", says Treasury Secretary Larry Summers, "productivity growth appears to have accelerated in a way no one could have expected several years ago."[1]

The Internet is a disruptive technology. It is both a threat and an incredible opportunity. The opportunity will only be realized as ND skill levels increase and utilize its capabilities. This will require a high level of commitment and a tremendous effort across the state.

Private-public collaboration, cooperation and consensus are needed in the areas of public policy, financing, leadership, advocacy, education and other initiatives. The Internet itself was supported for 30 years by public funds before it attracted private sector interest and investment.

Matt Robison, from the telecommunications coalition *iAdvance*, describes the Internet as the greatest growth engine in modern economic times. However, "…while all boats are rising, some are rising much faster than others."

The impact of technology and the subsequent changes in the economy are profoundly impacting North Dakota. The state faces tremendous new challenges as well as opportunities. Advanced networking capabilities are a critical component in realizing some of these opportunities.

[1] David Ignatius, The Washington Post, (July 11, 1999)

FINDING #1 – BEST PRACTICES FROM OTHER STATES

Findings

- North Dakota's strategy for a statewide network is being successfully implemented by other Mid-western states that have similar demographic challenges
- The successful development of the planned network will place North Dakota in a strong position relative to the capabilities of other state networks for 1-2 years
- Significant state investment is required
- Revenue sources have/can be accessed

Background

The out-of-state research and comparison with the current situation in North Dakota indicate that the ND strategy currently being implemented is a time tested approach and has been affirmed by the experience of many states.

Site visits were conducted in both Wyoming and South Dakota. The purpose of this portion of the project was to determine what could be learned from their statewide network experiences. Both states are similar geographically, are located in the Midwest and have populations fairly close to North Dakota's with South Dakota having slightly more residents and Wyoming having less.

Wyoming

The Wyoming Equality Network (WEN) resulted from a court system order for the state to provide a more equitable educational system. It was determined that a statewide network would be the tool for equalizing the opportunities available to Wyoming students. The main outcome of the WEN is to have the infrastructure to provide for the connection of computers, telecommunications systems and networks for the delivery of video, voice, data and imaging services among Wyoming's 23 counties.

The research included discussion with representatives of the Department of Education, Information Technology Division, University of Wyoming and the Wyoming Business Council.

The WEN project has two phases:

1) Deliver T1 service using Asynchronous Transfer Mode (ATM) to all high schools and deliver 56Kbps connections to administrative buildings and elementary and middle schools. Twelve remote schools are served by satellite.
2) Acquire and install compressed video equipment in all high schools.

To reach WEN's initial goal of connecting schools to the Intranet/Internet, US West was selected through an RFP process to design, construct and manage the 390 site high-speed data network.

In June of last year, the state signed a $3 million contract to meet the second phase of WEN. The contract provided for the 76 high schools and the Wyoming Boys School and the Wyoming Girls

School as well as the Departments of Education, Administration and Information to connect via compressed video.

The State of Wyoming has made considerable investment in this initiative. The initial legislative investment was $11,500,000 for the 1998-2000 biennium. This included the monthly service charges, installation costs, network management, customer premise equipment, video equipment and maintenance costs.

The next biennium begins on July 1, 2000 and the legislature has designated approximately $7 million. All of the appropriated dollars are “new money” to the schools.

The costs for the wide area network were primarily covered by the state. The five primary cost areas are detailed in Appendix A and include a description of the state-funded services.

Considering the size and remoteness of many areas within the state, Governor Jim Geringer is pleased with the direction the state is headed and has said, "…connecting Wyoming school children with each other and the world beyond is taking shape, on time and within budget." He also noted that while other states spent in excess of $200 million dollars, Wyoming had spent just $13 million in state funds.

Wyoming and North Dakota share many similarities in demographics and remoteness within regions of the state, however a substantial difference is noted when comparing the number of school districts: Wyoming has 48 districts compared to North Dakota's 230.

South Dakota

The statewide network initiative in South Dakota has been driven primarily by Governor William Janklow and has been a very high priority for his administration over the past several years. The network began with the unique approach of wiring the LANs in the districts (both public and private) as well as the higher education facilities.

Otto Doll, SD Chief Information Officer (CIO) and Ray Christensen, SD Secretary of Education, have been intensely involved throughout the project as they brought together resources from a variety of sources to fund and manage the project.

The *Wiring the Schools* project was completed in 1999 and involved miles of wiring and hundreds of hours of labor, a great majority of which was done by South Dakota prison inmates. The project is continuing with inmates now providing labor to wire public libraries and public hospitals.

The second education initiative, *Connecting the Schools*, focuses on the development and implementation of an ATM network to the K-12 schools and the higher education campuses. The Intranet will provide Internet access, video distance learning, T1 frame relay and T1 connections to every school. The project will also provide file servers and software, network administrator training, LAN switches, email services, and web hosting. See chart in Appendix B which describes the South Dakota network utilization growth as they ramped up their WAN.

South Dakota's district count is more similar to North Dakota's with 173 school districts. The state has made a large commitment to pay for the majority of the network-associated costs for the districts.

The following summarizes the investment made at the state level in South Dakota and Wyoming with their respective networks:

Network		**SD**	**WY**
Network spending in fiscal year 2000		$13,903,414	
Network spending in biennium 1998 to 2000			$11,500,000
U.S. West contribution for video equipment		$17,000,000	
Network spending in biennium 2000-2002 w/ video			$7,000,000
Network spending in fiscal year 2001		$ 4,625,000	
	Total	**$35,528,414**	**$18,500,000**
Training			
Training expenditures during the period of 10/99 to 9/00 (Wyoming conducted a pilot training program during the last biennium.)		$ 7,088,501	$ 250,000
Additional personnel for a new Office of Technology in the 2000 budget		$ 300,000	_____
	Total	**$ 7,388,501**	**$ 250,000**

The appropriation for training for the 00-02 biennium in Wyoming was reduced to zero by the legislature during the 2000 session during the budget reduction process. The executive branch budget recommendation was $4,000,000.

Canada

Networking advances in Canada were discussed with a representative from Telesat, a Canadian satellite services firm. Follow-up discussions were conducted with school districts in both Manitoba and Saskatchewan. All of the districts interviewed are utilizing one way satellite with up-link service through dial-up modems. This service is heavily subsidized to make it affordable for the school districts.

Other States

Information of best practices in other states regarding state networks and associated issues is included in Appendix C.

Analysis

The continual advances being made in telecommunications means ND's leadership position with the new network is temporary. The state will need to continually advance capabilities in order to stay competitive and provide opportunity to operate efficiently and effectively. Therefore, continual improvements and upgrades to the network will be essential.

Recommendations / Legislative Topics

1. Consolidate existing investments into a focused network deployment
2. Invest state dollars in the network start-up phase to allow system users the opportunity to jump-start network utilization
3. Educate the legislature to assure conveyance of the importance of the network investment
4. Educate the general public

FINDING #2 – K-12 ISSUES

Finding

Concerns of school representatives regarding the statewide network primarily focus on the issues of funding, service quality and governance.

Background

North Dakota's K-12 system has invested in distance learning over the last ten years, primarily in the area of interactive television (ITV). With the current interactive network, schools are connected on a regional basis. For example, students in Washburn have access to Spanish or German courses from a Bismarck site while students in Hebron have access to Anatomy or Physiology courses from Beulah or even an Art class from Tappen. Broader educational benefits are now possible by expanding this regional concept statewide.

Sendit Technology Services, formerly known as the two separate organizations Schoolnet and Sendit, provides network services to North Dakota's K-12 districts. In addition to providing technical assistance, Sendit is providing connectivity to nearly one-half of the state's K-12 districts.

Our research included numerous meetings with a diverse group of representatives from North Dakota's K-12 affiliated organizations:

- NDCEL – School Administrators
- NDSBA – School Board Association
- CII – Center for Innovation in Instruction
- NDASTL –School Technology Leaders
- ETC – Education Technology Council
- DPI – Department of Public Instruction
- Sendit Technology Services. A provider of network and technology services including teacher training

Concerns expressed by ND K-12 schools regarding the statewide network

1. The state will not "come up with the money"
   - State will not pay related costs
   - Who will bear the costs of compliance
   - Do not want network to be another un-funded mandate
   - Schools do not want state funds simply shifted from foundation aid to statewide network
2. Quality of service and support will be insufficient
   - Traffic from private sector usage will clog up network
   - Monopolies leave no options if things don't go well
3. Do not believe it will be cheaper than current services
   - Schools may no longer qualify for E-rate, discounts and free Internet service
4. Concerned about loss of local control

Responses to K-12 concerns regarding the statewide network

Financial Concerns

- The executive branch is currently developing budget recommendations for the implementation of the statewide network. Considering the emphasis on technology in the governor's state-of-the-state address in January, it is our belief that the network initiative will be given strong budget support.
- The next legislative session will be crucial regarding network funding decisions. The 1999 executive budget did not have dollars included for network implementation and the 1999 legislature did not allocate funding as recommended in previous studies.
- The schools are sensitive to the fact that the dollars appropriated for network services are not a plus-minus situation. They are wary of a reallocation of education dollars rather than new technology dollars being made available.
- The RFP results will determine how much financial impact the inclusion of the K-12 schools will have on the overall cost for network services.

Cost of Service Concerns

- Aggregation has proven to be very successful in reducing overall costs in researched states
- Schools will still qualify for E-rate reimbursement
- Preliminary information indicates the schools will receive broadband services at favorable prices. As school's bandwidth requirements increase, the benefits of aggregated demand continue to escalate.

Service Quality Concerns

- The fact that the state is not developing the network, but rather is purchasing the service from a professional network services firm is strong reassurance that the districts will receive a high quality service. The districts will actually have much more leverage if they experience service quality concerns, as they will be able to use the leverage of the state contract. Higher level support will also be available, as there will be direct contact with executive management of the telecommunication providers.
- The network specifications call for considerable scalability as demand for broadband is projected to escalate dramatically. It will be vital that the service provider continues to upgrade capabilities. The option years in the RFP provide strong incentive for continual improvement of network. capabilities. The RFP is located on the state web site at the following URL: http://www.state.nd.us/itd/commun/communhome.html

Local Control Concerns

- School districts are already using the aggregated demand approach on a wide scale. Nearly 50% of the districts currently receive network services/Internet from Sendit.
- This approach has been utilized very effectively in other states. As more states become cognizant of the benefits, many more have made the move toward implementation.
- District PC labs can still utilize existing PC's
- Districts are not required to be connected to a WAN or receive Internet services. The legislation does require purchasing network services through the joint contract if WAN services are desired
- The determination of how to use the network to best meet the needs of the local district is the district's decision

K-12 Network Wish List

Input from North Dakota schools provided the following list of needs:

a. High speed connections at low cost
b. Filtered Internet access that is highly reliable
c. Electronic delivery of courses and video streaming
d. Desktop video capability
e. Administrative meetings via desktop video-conference
f. Website hosting and student email services

Analysis

As ITD has continued with the implementation phase of the network, school district representatives have been able to obtain more definitive answers to questions and concerns regarding the network plan. Their concerns appear to be easing as more detailed information on the new network has become available. Discussion regarding the network has evolved to a new level as factual information has replaced the uncertainties that normally accompany change.

ITD has been active in meeting with school officials contributing not only to the understanding of issues but also assisting in acceptance of new technologies, ideas and opportunities the network will bring.

A primary concern has been the waiver of requiring districts to be on the network. One exception has already been granted to the Greater Southeast Interactive Television Consortium for its high-speed network contract with two Rural Telephone Cooperatives. This has proven that the state will grant exceptions when merited. ITD validated that the Consortium's network is oriented toward the future and fits with the technology being pursued by the state.

Some districts have been concerned that current service would be diminished with the new network. Alleviating this concern are the required capabilities noted in the RFP. The service standards noted within assure high service quality for the districts.

The case for advanced telecommunication capabilities is magnified in communities where dwindling enrollments and a shortage of teachers in math, science and other specialty courses can decrease educational opportunities. Providing a content rich curriculum in these settings is difficult. Distance learning does provide some alternatives that offer new solutions. Whether it is chemistry experiments that are done with software instead of purchasing and disposing of expensive chemicals or a virtual tour with full motion video in the rain forest, the educational experience can be greatly enhanced through effective use of technology. Foreign language students can now read the daily paper in Munich or chat with their peers in Spain, helping improve foreign language skills of students in North Dakota as well as in Spain.

The benefits for the students are tangible but they are not free. General funding allocations in the researched states were critical to network implementation. The network plan has been developed and reviewed by in-house technical staff, an experienced network design firm (Federal Engineering) and representatives of the telecommunications industry. All have found it to be a solid plan that will provide effective service to ND's schools, whether large or small.

Recommendations/Legislative Topics

1. The implementation should proceed with K-12 districts' participation. There are some districts that will garner more benefits than others. The majority of K-12 schools will have access to much greater capability at significantly lower cost for equivalent services.
2. Continue dialogue with K-12 entities to assure that concerns are heard, understood and explained. This will also be an opportunity for K-12 to understand legislative direction and intent and for the legislators to understand the educational needs.
3. State funding should be appropriated to cover the capital and service costs associated with the network implementation.
4. The state should remain flexible in order to take advantage of constantly evolving technologies. The districts want to keep pace with advancing technologies as they become available.
5. The state should expect network demand to grow exponentially.
6. The 2001 Legislative session will face two primary questions:
   - state investment in the network
   - determining whether participation will be mandatory

FINDING #3 – DISTANCE LEARNING

Finding

A critical component of the South Dakota network implementation was the existence of a strong, well-coordinated distance learning program to train teachers, administrators and technology coordinators how to effectively utilize technology in education.

Background

North Dakota educators have received distance learning training from a number of different sources. Some of the training is provided locally along with regional and statewide programs that are provided by a number of different organizations.

While the project scope did not include an assessment of the effectiveness of current training programs for North Dakota public school staff, we did interview individuals from several training organizations. A team member also attended the CII conference in Valley City on March 14th. The training is currently being provided by organizations such as:

- Center for Innovation and Instruction (CII), Valley City
- Sendit Technology Services, Fargo
- TNT Conference, Bismarck
- TWT – Teaching with Technology (a $7 million federal grant from the Department of Education that makes training available to every ND teacher.)
- Colleges & Universities (five campuses have teacher education programs)

Analysis

As research was conducted, it became clear that the synergy created by state educators and the IT department working together was a critical component in the success of network implementation and utilization for the K-12 school districts.

This observation led to the following question regarding North Dakota. Who is the recognized leader in establishing a vision for effective utilization of the new technologies for educating ND's children? The answers received from a variety of ND educational leaders were consistent. There is no recognized leader but rather a number of individuals and groups that are providing valuable services that are advancing the knowledge level of ND school personnel on a regional/statewide basis.

We did not find, however, a clear statewide vision or mandate for leadership regarding the utilization of technology in schools. Input received from the districts verifies the wide range of views regarding technology's role in education as detailed in Appendix D. The lack of a clear statewide vision support the belief that effective leadership that is able to develop a strong, clear vision for the future is critical.

Technology has had a dramatic impact on business as well as schools. It is a huge challenge for any business to stay current in this day of rapid change. For school districts, the challenge is staggering. A unified approach with support from all involved entities will be required to

successfully meet this challenge. A collaborative approach between business and education with support from all levels is vital and provides an excellent opportunity for these two groups to work together.

It is encouraging to see that North Dakota currently ranks near the top in providing students with computer access.[2] It will be costly to continue to update the hardware and software in the years ahead as we seek to keep technology current.

We foresee an explosion of "technology tools" in the next few years that will tremendously enhance distance education capabilities. Teachers can now involve parents and provide the student with a much higher level of accountability.[3] Futuristic tools will provide enhanced means to support and further the educational experience.

In addition, some ND schools already have difficulty hiring qualified teachers. Therefore, the utilization of advanced distance learning opportunities will continue to grow.

While we do not anticipate technology eliminating the human interaction that is so vital to development, the significance of technology as a tool to supplement, support and enrich the academic goals of the district is immeasurable.

In the fall of 1999, the Benton Foundation teamed up with the EDC/Center for Children and Technology to produce a report that found several commonalties among the four school districts studied. The following are of note:

- *Professional development needs are increasing geometrically. As one might expect, wiring a school district leads to a range of challenges, but as far as educators are concerned, professional development is at the top of the list. If teachers and librarians can't learn how to utilize the Internet effectively and make it a powerful tool for themselves and students, districts might as well be burning money.*
- *The E-Rate is turning many schools into technology centers without a full-time high-tech staff. Research suggests that schools must spend 30 percent of their technology budget on professional development, yet the national average is closer to only 3 percent. What good is having a nation of online schools and libraries if no one (except the students, of course) knows how to use them?*

North Dakota's Teaching with Technology (TWT) program provides a tremendous opportunity for the state to enhance teacher knowledge levels regarding technology use in the classroom. Seven million dollars has been made available under this program and will provide a significant step in the right direction. However, adequately training all of North Dakota teachers remains a notable challenge when the magnitude is evaluated. Currently there are nearly 10,000 teachers to train over the five years of the program, providing only $144.00 per year per teacher. Training levels must go far beyond this to achieve the level of proficiency that is required to adequately educate North Dakota's youth.

[2] "Many N.D. students have computer access", Bismarck Tribune, March 27, 2000

[3] "Internet gives parent look at kids' grades", Bismarck Tribune, February 21, 2000

Recommendations/Legislative Topics

1. Establish education technologist position as key state leader for educational development
2. Analyze current technology training and funding
3. Analyze existing technology training and distance learning programs for school personnel and determine the following:
   - What organizational structure should be utilized to advance the most effective training programs for K-12 teachers, technology staff and administrators?
   - What are the training objectives?
   - How can existing dollars be used to obtain the most effective training programs?
   - What new funds are needed?
   - What sources are available for those new funds?
4. Determine the level of investment required to enable the K-12 community to effectively utilize broadband capabilities in the classroom
5. Legislative decisions will include:
   - What entity will coordinate the training initiatives or will the training continue to be provided by different sources?
   - What investment will be made by the state toward additional training?
   - Will the state utilize potential federal funds in combination with other available funds to create a larger pool from which to draw for a more coordinated training approach?

FINDING #4 – FUNDING OPPORTUNITIES

Findings

- Opportunities exist for obtaining substantial federal funding for training and network utilization skills if collaboration is evident and program outcomes affect a broad range of citizens
- Earlier grant emphasis favored infrastructure investments
- Training and programming are now being emphasized. Technology centers, such as the Valley City plan, have been supported
- Collaboration is vital to obtaining grants. Public/private partnerships are encouraged and rewarded

Background

Over the past ten years, funding for telecommunications has been provided through many federal agencies and affiliated programs. Funding for telecommunications projects continue to expand as the federal government recognizes the magnitude of the industry and the impact of the "Digital Divide" on communities outside urban America.

Initially, federal funding concentrated on infrastructure and equipment projects. As networks have developed, funding has shifted toward use of the networks as well as training, particularly of educators. The National Educational Goals Panel noted in its January 2000 publication that "…technology education has shifted from hardware to finding appropriate software that complements the curriculum and provides professional development opportunities to teachers."

Another strong area of growth in federal telecommunications funding focuses on collaboration and linkages, particularly among public government units. Business partnerships with public agencies are strongly encouraged under current federal guidelines.

One program that is of particular note is the Community Technology Centers project of the Department of Education. This program was initially funded in 1999 and 40 projects received nearly a total of 10 million dollars. Funding for 2000 has increased to $32.5 million and is budgeted at $101 million for 2001. Additionally, the Technology Opportunities Program (TOP, formerly TIAPP) of the Department of Commerce has funded at least one North Dakota project every year, bringing in over $2.5 million to local projects.

Appendix E details a list of federal grants that have been received by ND entities for telecommunication projects.

Analysis

South Dakota provides a good example of how dollars can be gathered from a variety of different sources and utilized on a specific project that has statewide benefits. It requires support from the highest levels to overcome the individual or more regional interests that will oppose the pooling of resources.

Connecting the Schools Fund Sources		
Terry Waite Foundation Donation	$	500,000
Federal School to Work Grant Funds	$	490,000
Technology Training Fund Sources		
Goals 2000	$	1,458,374
Technology Literacy Challenge Grants	$	1,756,223
One-time Goals 2000 Funds	$	1,641,190
Miscellaneous	$	1,108,704
Total	**$**	**6,954,491**

Recommendations/Legislative Topics

1. Aggressively pursue outside funding sources in a cohesive, multi-agency approach for training of teachers, technology coordinators and administrators
2. Establish which position/agency will coordinate and lead the technology-training program for K-12 teachers, technology coordinators and administrative staff
3. Establish a comprehensive statewide training plan for utilizing network applications as a first step. Utilize the strong points from each existing program. It is important to have this plan in place when seeking funds for the training program
4. Provide ITD with sufficient access to capital dollars for rapid implementation of the network

FINDING #5 – STATUS & OUTLOOK OF BROADBAND IN NORTH DAKOTA

Findings

- The widespread deployment of affordable broadband services is critical to the future of North Dakota and will serve a wide range of needs.
- The proposed statewide network will encourage the continued deployment of broadband services throughout the state.
- There are positive developments in the deployment of broadband services in both urban and rural areas.
- Areas of the state remain underserved.
- Telecommunications regulation should be reviewed to ensure competition, deployment of advanced services, affordable pricing, and universal access throughout the state.

Background

Iadvance[4] has labeled North Dakota as a member of the "Disconnected Dozen", one of 12 states that are falling behind in deployment of Internet backbone hubs and are now at serious risk of being denied the end-to-end broadband Internet access their citizens require to stay competitive in the emerging digital economy.

North Dakota is one of six states in the nation that does not have at least one Internet backbone hub, the major connecting point to the Internet.

High-speed connectivity is a critical component of the Internet of the future. Businesses will require connectivity to enhance operations, gain access to global markets, and improve workforce productivity. Educational institutions will utilize high-speed Internet services to deliver improved curriculum and training programs. High-speed connections will be required for citizens and communities to provide access to entertainment, products, and services.

Analysis

This analysis provides a snapshot of broadband deployment activity in North Dakota. The study team reviewed 25 North Dakota communities to determine the availability of Internet access and broadband services. Three methods for broadband Internet connectivity were surveyed; digital subscriber line (DSL) using traditional phone lines, cable modem, and wireless broadband.

[4] iAdvance is a coalition of computer companies, public interest groups, high-tech organizations, Internet companies, telecommunications companies and others who see the overriding need to improve the quality and speed of the Internet.

Nationally, as of the end of 1999, nearly 1.9 million United States households subscribed to one of these three methods, representing a 185 percent increase over 1998 totals.[5] This group represents 4% of all Internet households (46.5 million).

By 2004, it is expected that more than 25 million US households will have high speed connectivity - with cable modems serving 46 percent, DSL serving 40 percent, and wireless serving 14 percent.[6]

The following table outlines the results:

Table 1 - North Dakota Broadband Access

City	Dial-up (narrowband)	DSL	Cable	Wireless
Beulah	Yes	Yes	Planned – 2000	No
Bismarck	Yes	Yes	Yes	Yes
Bottineau	Yes	No – Possible 2000	No	No
Cando	Yes	Planned – 2Q	No	No
Carrington	Yes	Planned – 2Q	No	No
Casselton	Yes	No	Planned – 2000	Yes[7]
Crosby	Yes	Planned – 2Q	No	No
Devils Lake	Yes	Yes	No	No
Dickinson	Yes	No	No	No
Enderlin	Yes	No	No	No
Fargo	Yes	Yes	Yes	Yes
Garrison	Yes	Planned – 12/31	No	No
Hettinger	Yes	Yes	No	No
Langdon	Yes	No – Possible 2000	No	No
Linton	Yes	Planned – 12/31	Planned – 2000	No
Mayville	Yes	No	Planned – 2000	No
Minot	Yes	Yes	Planned - 2000	Planned – 2000
Oakes	Yes	Planned – 2000	No	No
Park River	Yes	Yes	No	No
Rugby	Yes	Yes	No	No
Stanley	Yes	Yes	No	No
Valley City	Yes	No	Planned – 2000	No
Walhalla	Yes	No	No	No
Watford City	Yes	No	No	Yes[8]
Williston	Yes	No	No	No

[5] The Strategis Group (February 15, 2000)

[6] Ibid.

[7] Available from Fargo providers.

[8] Limited availability

The study team noted a number of positive developments related to the deployment of advanced and affordable telecommunications services:

- The Information Technology Department has prepared an excellent Request for Proposal for a statewide network connecting state agencies, higher education, schools and local government. At a recent bidder conference, 27 companies were present expressing interest in this initiative.
- Dakota Carrier Network, a telecommunications company owned by independent telephone companies, has a fiber-optic network capable of providing substantial broadband services throughout the state.
- Midcontinent Communications has laid fiber optic cable to connect its statewide facilities and plans to offer broadband services in up to 60 North Dakota communities in 2000.
- Multiple organizations in the state are considering deployment of advanced broadband wireless services with coverage capabilities up to 30 miles.
- IdeaOne Telecom Group is a competitive local exchange carrier offering advanced voice and data services in Fargo.

As expected, the deployment of broadband services does not happen on a consistent basis. Urban areas are more likely to have multiple options and receive access before the rural areas. While market forces will drive this, it is important that North Dakota's rural communities do not fall too far behind.

Recommendation/Legislative Topics

The scope of this study did not include the effect of telecommunications regulations on the State of North Dakota. However, the study team recommends that the state review the regulation of the telecommunications industry to ensure regulation encourages the desire outcomes. Those outcomes should include encouraging competition, maintaining affordable pricing, and providing universal access throughout the state.

FINDING #6 – ECONOMIC DEVELOPMENT

Findings

Telecommunications and technology present viable economic development opportunities for North Dakota including:

- Reducing the distance between rural and urban centers - offering new employment opportunities
- Opening national and international marketplaces for North Dakota products and services
- Providing new capabilities for business efficiencies and productivity enhancements to new and existing companies

However, this new technology also creates economic development challenges including:

- Increasing the need for a technology literate workforce
- Enabling global competition for local businesses
- Creating the requirement for advanced infrastructure to attract employers and employees and support existing firms

North Dakota's economic development policy needs to address the following areas:

- Ensuring a technology literate workforce
- Developing an advanced and affordable telecommunications infrastructure
- Leveraging capabilities of higher education and research institutions in partnerships with private enterprise
- Creating access to venture capital
- Providing technology education and resources for economic developers

Background

For this finding, the study team utilized input from the state's economic developers, feedback from other states, and results from two separate national studies on high-tech job creation.

Milken Institute Study[9]

The Milken Institute conducted a recent national study on the growing high-tech sector which found research centers and institutions were indisputably the most important factors in incubating high-tech industries. These institutions provide local companies streams of cutting-edge knowledge, as well as streams of technology smart labor.

The Milken study, prepared by Ross C. DeVol, also observed that "many of the traditional location factors that have always attracted industries are also important to high-tech firms. These

[9] Milken Institute, Santa Monica, CA, America's High-Tech Economy Study, July 1999.

factors are generally referred to as 'cost of doing business measures': tax rates or incentives, compensation costs, land and office space costs, energy costs, capital costs, and firms' perception of the general business climate."

"However," the report continues, "other factors appear to contribute the most to high-tech firms' location decisions. They include: access to a trained/educated work force, close proximity to excellent educational facilities and research institutions, an existing network of suppliers, availability of venture capital, climate and other quality of life factors, and the general cost of living."

Finally, the study notes "Just as we have changed our view about the contents of technology from a relatively pure form of products to a more complex combination of ideas, creativity and other entrepreneurial activities, economic development policy should adjust to being about the building of cultural and social environment as well as physical infrastructure... "

The top 315 metropolitan areas in the United States were ranked. A sampling of the ranking is as follows:

Table 2 - Milken Institute Metro Rankings for High-Tech Economy

City	Ranking
San Jose, California	1
Dallas, Texas	2
Los Angeles, California	3
Boston, Massachusetts	4
Seattle, Washington	5
Rochester, Minnesota	16
Minneapolis/ St. Paul, MN	32
Cedar Rapids, Iowa	35
Omaha, Nebraska	52
Lincoln, Nebraska	118
Duluth, Minnesota	129

City	Ranking
Sioux Falls, SD	178
Fargo, ND	**196**
Billings, Montana	205
Cheyenne, WY	**221**
St. Cloud, Minnesota	241
Bismarck, ND	**250**
Dubuque, Iowa	277
Rapid City, SD	281
Grand Forks, ND	**282**
Steubenville, Ohio	315

Progressive Policy Institute[10]

The Progressive Policy Institute developed The State New Economy Index, a set of economic indicators designed to highlight the differences among the structural foundations of state economies. The purpose is to focus attention on a progressive policy framework to promote economic development in the New Economy.

[10] Progressive Policy Institute, Washington, DC, Study on the New Economy, July 1999.

The study utilizes 17 indicators that measure the number of "Knowledge jobs", globalization, economic dynamism and competition, the transformation to a digital economy, and technological innovation capacity.

The overall scores for selected states were as follows:

Table 3 - The State New Economy Index

State	Ranking	Score
Massachusetts	1	82.27
California	2	74.25
Colorado	3	72.32
Washington	4	68.99
Connecticut	5	64.89
Minnesota	14	56.53
Wyoming	41	34.49
South Dakota	43	32.33
North Dakota	**45**	**28.99**
US Average		**48.07**

The study concludes with five major economic development strategies:

- centering on education,
- creating an infrastructure that fosters innovation,
- innovation-oriented and customer-oriented government,
- fostering a transformation to a digital economy,
- civic collaboration.

North Dakota

In the book "Changing Places," Richard Moe and Carter Wilkie write: "Communities can be shaped by choice, or they can be shaped by chance. We can keep on accepting the kind of communities we get, or we can insist on getting the kind of communities we want."

North Dakota and its communities are at a crossroad. The new digital economy has rapidly arrived and creates both attractive opportunities and ominous challenges.

From an opportunity standpoint, technology reduces the distance between rural and urban centers. North Dakota products and services can be electronically marketed all over the world.

The digital economy also leads to job creation. For example, the demand for Information Technology workers is large and growing. Employers will attempt to fill approximately 1.6 million new IT jobs in 2000. It is estimated that as many as half of those positions will likely go unfilled due to a shortage of skilled employees.

Because technology can reduce the distance between rural areas and high-employment centers, North Dakota workers could fill some of these positions if they have the appropriate training and required network infrastructure.

This technology also creates economic development challenges. North Dakota employees must be technology literate. North Dakota businesses are competing in a global marketplace. Therefore, a local business not only competes with a store down the road but also with businesses from all around the world.

New opportunities are available to North Dakota businesses as the statewide telecommunication capabilities advance. A Mayville business is currently seeking affordable connectivity to expand their business. A training center in Cooperstown needs broadband capabilities to further their classroom effectiveness and in LaMoure a local business is seeking to make their catalog offerings more efficient through electronic collaboration.

These examples show how vital the availability of affordable, advanced telecommunication services are to North Dakota's economic future.

Recommendations/Legislative Topics

This study finds five focus areas for North Dakota's economic development policy that should be supported by the legislature in the policy setting process:

1. A **technology literate workforce** is critical in attracting new companies and new jobs to the state.
2. The **development of an advanced and affordable telecommunication infrastructure** impacts the state's ability to attract and retain businesses and provide quality education.
3. The **leveraging of the capabilities of higher education and research institutions** with private enterprise is viewed as a critical component in the creation and growth of high-tech companies.
4. **Access to venture capital** is also a critical component in creating and growing high-tech companies.
5. **Technology education and resources** are required for the state's economic developers in order to provide them with the tools necessary to recruit new businesses and jobs to North Dakota.

FINDING #7 – 1999 FISCAL NOTE MEASURES

Finding

Telecommunications spending for North Dakota's public institutions is expected to increase over the next several years. The spending increase will be driven by expanded use of the Internet, enhanced use of distance learning applications, and increased demand for multimedia services. The deployment of advanced telecommunications capabilities will also require additional investment and spending.

The January 1999 Telecommunications Plan Fiscal Note identified the potential financial implications of implementing a statewide telecommunications strategy. These implications included the identification of potential savings by aggregating the buying power of public institutions and negotiating agreements at a state level.

Responses to the statewide telecommunications RFP are due in June 2000. Those responses will provide a much clearer picture of future costs for telecommunications services and equipment.

Background

The following text is a selection is from the 1999 Telecommunications Plan Fiscal Note Analysis prepared for the North Dakota Legislative Council.

> *In 1998, the state of North Dakota spent approximately $19.3 million on telecommunications services for state agencies, universities, public schools, counties and municipalities*
>
> *Based on industry data, this spending is expected to increase 20% a year, resulting in telecommunications spending of $57.6 million annually by fiscal year 2005.*
>
> *Conservatively, the expected financial benefit of implementing an enhanced Information Services Department and establishing statewide telecommunications services is a 3% reduction in spending growth. This translates into savings of $6.7 million over the next six years.*

Trends and Key Indicators

- U.S. spending on professional and technical services in support of voice and data communications equipment rose 18.1 percent in 1999.[11]
- Total U.S. spending for telecommunications equipment and services will grow at an average rate of 11.3 percent through 2003.[12]
- Bandwidth demand is doubling every 100 days.

[11] MultiMedia Telecommunications Association, <http://www.mmda.org>, 2000.

[12] Ibid.

- The Internet bandwidth supporting the North Dakota University System has grown by over 300% in the past two years and the University is still having difficulty in meeting demand (see inset).
- The Greater Southeast Interactive Television Consortium is implementing an advanced telecommunications network that will increase annual expenditures from $135,000 to $372,000.

ITS Places Restrictions on use of Internet applications

March 3, 2000

Information Technology Services at NDSU has announced that Napster client software, a program for sharing recorded music over networks, and similar programs are officially banned for use by NDSU faculty, staff and students.

"Over the past months several applications have become popular on the Internet that are designed for the sharing of audio and video files," said Dick Jacobson, HECN systems administrator and security officer. "These files tend to be very large, sometimes entire CDs or movies, and have had a negative impact on NDSU's local networks and providers."

Conclusions

This analysis included information from the experience of other states, reviewing industry data, and meetings with the North Dakota Chief Information Officer and the North Dakota University System Chief Information Officer. Three main conclusions were drawn:

1. Telecommunications spending will increase. This increase will be driven by the need for increased bandwidth and telecommunications capability
2. Efficiencies will be gained by aggregating demand and buying power and moving forward under the leadership of the Information Technology Department
3. The financial impact of moving forward with the statewide network can be more conclusively determined upon receipt of the responses to the Statewide Communications Network RFP. Both capital spending requirements and service costs will be accurately projected based on the selection of a provider(s)

APPENDIX A

Site Visit Supplemental Information

The following information was obtained through Inteliant's site visits to Wyoming and South Dakota.

Wyoming:

The State of Wyoming has made considerable investment in the Wyoming Equality Network initiative. The initial legislative investment was $11,500,000 for the 1998-2000 biennium. This included the monthly service charges, installation costs, network management, customer premise equipment, video equipment and maintenance costs. The next biennium begins on July 1, 2000 and the legislature has designated 7 million dollars.

The costs for the wide area network were primarily covered by the state. The five primary cost areas and the state's allocation are as follows:

- **Wiring of school buildings**

Local Area Network (LAN) wiring is a local district responsibility. The state did coordinate with the local schools to ensure the LAN infrastructure best fit with the WAN. On the second phase, the state is doing some video installation and video wiring from the 3Com MUX.

- **Equipment**

The state covers the cost up to the point of demarcation, which is defined as up to, and including, the router.

- **Support**

Maintenance, management on state supplied network devices are covered by the state.

- **Training**

Teachers were trained by the state on a pilot project basis. The $4,000,000 funding recommendation in the governor’s budget was reduced to zero during the 2000 legislative session due to required budget cuts.

- **Connectivity**

The state pays for connectivity charges. This includes Internet service over the network. All high schools are provided with a connection at no cost to the district and the local district pays for any enhanced services that are desired above this level. The standard service level to elementary schools is 56K and a T1 for each high school.

South Dakota

As in the case of Wyoming, the costs for the wide area network were covered primarily by the state. Funding for South Dakota's network is as follows:

- **Wiring of school buildings**

The state arranged for inmates to do the wiring. (Both Local Area Network wiring as well as additional line voltage wiring in the school for PC's, printers, etc.) The local school paid for supplies and food, and housing for the inmates while they were at the district. A local contractor was hired to supervise the installation.

- **Equipment**

The state provides nearly all of the equipment except the desktop computers, printers and the associated LAN.

District receives -- Video equipment, ethernet switch, file server and software, backup, UPS, CSU/DSU, router, ATM switch, email services & WWW hosting services.

- **Support**

WAN management and support along with WAN reports are provided by the state.

- **Training**

The SD Department of Education provides instructor, administration and technical training. Teachers are trained for a one-month period during summer break with the state paying a $1,000 stipend to the teacher in addition to providing the training at no cost.

- **Connectivity**

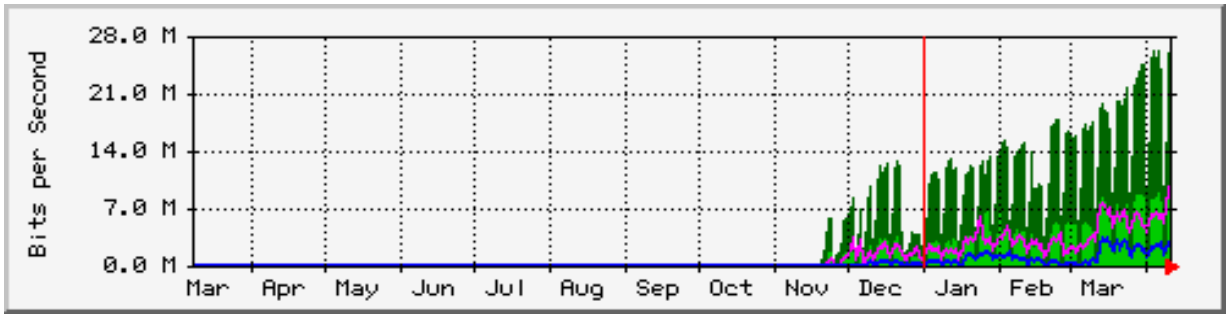
T-1 (high school) or 56K network connectivity with Internet service.

Existing dollars from the local district that would have paid for the above equipment/services are to be put toward purchase of desktop computers, software and support.

APPENDIX B

South Dakota Network Utilization Growth – Network Ramp-Up

Yearly Graph (1 Day Average)



Max In:	27.7 Mb/s	(91.1%)
Max Out:	9578.8 kb/s	(31.5%)
Average In:	3258.1 kb/s	(10.7%)
Average Out:	1001.7 kb/s	(3.3%)
Current In:	9380.5 kb/s	30.9%)
Current Out:	3236.7 kb/s	(10.6%)

APPENDIX C

Other States' Best Practices

Arizona: An ATM demonstration project is underway whereby the state's core communications hub, Arizona's Department of Corrections, an off-mall physician's office, a major new prison facility and juvenile corrections facility are connected.

Colorado: A strategic plan for a statewide ATM network has been developed. The network will carry data, video, and voice traffic for all state agencies and provide connectivity for local governments, schools, libraries and public hospitals. The plan calls for 75-aggregated network access points located throughout the state.

Delaware, Idaho & Indiana: All three states have implemented increased videoconferencing services between state agencies to not only improve communications but also to reduce state agency travel costs. Indiana is anticipating savings of hundreds of thousands of dollars in state employee travel expenses.

Minnesota: Higher education and other state agencies are exploring how ATM could benefit campuses for video and data communications in an effort to improve cost-to performance ratios. A key element is to gain more efficient and flexible use of bandwidth--including expanding data bandwidth when video is not in use and enabling user-initiated connections.

The state has also entered into a contract for a provider to build and maintain a fiber optic network along 2200 miles of state freeways and highways. The network will be operated as a communications carrier to telephone companies and other resellers. The project is privately financed and funded. The state will be allowed 20% of the fiber optic network capacity.

Mississippi: The state has recently evaluated technologies to support a multi-media backbone in which data and video could be supported as well as save on costs. ATM was selected as it will provide a flexible environment that will inter-operate efficiently with existing frame relay while making more efficient use of scalable bandwidth.

Montana: The state is currently upgrading the state's network and actively working with the National Guard Distance Learning Network, independent telephone companies and other video service providers to interconnect all state video networks.

North Carolina: The North Carolina Integrated Information Network (NCIIN) provides WAN functionality for state and local governments as well as K-12. NCIIN supports data, voice, video

and imaging. Services are provided to state agencies as a "turnkey" service offering. Staff provides planning and implementation services as well as operational and support services.

New Jersey: The New Jersey Department of Military and Veteran's Affairs is piloting a distance learning system among the armories throughout the state.

New Mexico: The New Mexico Office of Communications has installed Spread Spectrum Digital radio at strategic rural sites that do no have alternative communication providers available.

In August 1998, the state approved a pilot project to test ATM hardware on the fiber backbone and determined that ATM is the only viable solution for the backbone. Further, it was determined that initial costs would be manageable while benefits and savings would be significant.

Pennsylvania: A 16-company consortium was selected to provide telecommunication services for state government, saving at least 100 million dollars in 5 years, compared to existing and projected costs. The contract will stimulate advances in the public communities' network needed for e-business to flourish. The Secretary of Administration Thomas Paese noted that the cost savings are due in part "…to our revised approach to bidding state government's telecommunication services. Instead of the 22 separate contracts we've had in the past, we've consolidated those contracts to leverage our buying power and gain a strategic advantage. This isn't just a technology success story--it's a procurement success story. " The 5 year contract covers provision of voice, data, video, basic digital transport and Internet service for all three branches of government. Additionally manual business process will be replaced by an ecommerce system that supports electronic billing, online provisioning, and help desk support, among others.

The commonwealth has invested 132 million dollars in the Link to Learn Initiative, which seeks to improve the use of educational technology in schools. In addition to providing schools with computers, networks and Internet connections, it emphasizes professional development for educators to use new technologies more effectively.

Tennessee: The Tennessee Information Infrastructure (TII) will integrate separate state networks and provide a common infrastructure statewide for current ad future network needs. Objectives are all geared to delivery of social services (education, health care, libraries and community information) by leveraging assets with the current telecommunications infrastructure and extending its capabilities to handle future requirements.

Texas: The Texas Telecommunications Services Division (TSD) initiated planning sessions with major state universities that began the process of consolidating large networks to achieve economies of scale, increased cost effectiveness and enhanced technology.

Utah: The 2000 Legislature passed HB 167 which created the IT Infrastructure Innovation Program. The program serves as a vehicle for reinvesting savings from successful technology initiatives into new projects, saving taxpayer resources and promoting a continuos cycle of improvement.

Virginia: The Department of Information Technology (DIT) coordinates the efforts of Executive Branch agencies and institutions to leverage the buying power of state government in regard to telecommunications services. Special attention is paid to aggregating state demand for high-speed telecommunication services in rural or under-served areas where there is a legitimate need for such services by state and/or local government. Private sector providers are encouraged to recognize the commercial viability of offering these services in such areas.

Wisconsin: BadgerNet manages a number of separate networks that provide telecommunication services under its umbrella. BadgerNet provides long distance voice services, data transport services and full-motion interactive video services. Eligible users for BadgerNet are state agencies, universities and dormitory residents, technical colleges, public and private schools, libraries, counties and municipalities.

Wisconsin's $200 million TEACH (Technology for Educational Achievement) Initiative allows K-12, private schools, technical colleges, private and tribal colleges and public libraries to boost investment in educational technologies and allows the entities a variety of options to further these goals. Reduction of wiring costs, furnishing technical assistance and training grants, improving telecommunication access and assisting with purchase of educational technologies are all included in the goals.[13]

[13] Information garnered from Networks: 1999 State Reports, The Association for Telecommunications Professionals in State Government. The Council of State Governments. Lexington, Kentucky 1999, and information from state sources.

APPENDIX D

Survey Information

The following information was obtained from North Dakota K-12 schools regarding their problems/concerns with their present service providers. The comments, not placed in any particular order, provide a sense of how varied the needs are among ND school administrators.

- High cost of T1 lines
- Connect the educational video networks into one system. Option to opt out of SB2043 if better or equal services can be realized at a lesser cost
- We are just starting Internet capabilities. Next week students will be able to use the Internet
- Can't get enough broadband for the needs of the district
- None, ND Schoolnet works just fine
- We are very pleased with our present service providers for telephone, ITV and Internet access
- Not enough bandwidth – need at least T1. Cost prohibitive
- None- ND Schoolnet has been a very reasonable and cost effective provider. They are very responsive to problems that arise
- We would like a faster speed
- Things are going extremely well now that we have virtually eliminated US West from our network
- None, very good service with GWN (Great Western Network)
- Need for T1 or faster circuits; availability/cost
- Bandwidth
- None! Excellent!
- None – We are in top shape
- Distance from the phone line relay is too far to access high speed Internet access
- Limited to 33.6 kbs service
- Slow speed or interruptions in service
- None – Excellent service with few problems – do not foresee any future needs
- Very slow during school hours. Seems to be lot of traffic from a variety of schools. Speed is only good early morning or late afternoon
- Internet ISP is great. Frame relay providers – Good service, too expensive
- Need more bandwidth (T1) – cost prohibitive
- We have no problems with our present service provider
- We need a strong, comprehensive central agency that can guide and support schools and handle the many emerging technology issues schools are facing

APPENDIX E

FUNDING SOURCES

Distance Learning and Telemedicine Loans and Grants
Rural Utilities Service
Department of Agriculture

Purpose: Helps rural schools and health care providers invest in telecommunications facilities and equipment to bring educational and medical resources to rural areas, especially through distance learning and telemedic ine projects utilizing Advanced Technologies. Funding is "hardware intensive" but other capital costs including installation and training are considered. It is intended to fund systems that deliver services in rural areas through structured interactive educational training and/or medical professional presence. Not intended for stand-alone entity. Projects must be self-sustaining after start-up.

Range of grants: FY 2000, $13 million in grants, plus grant-loan packages $77 million

ND Grantees: 1993: University of North Dakota, School of Medicine, MEDSTAR Project
1993: New Dimensions Information Authority, Northwest regional library system that developed a computer-based regional union library catalog.
1994: West River Health Services, Hettinger, Teleradiology- Information System (TELIS Link)
1995: MedCenter One, Bismarck, Interactive video links to Elgin, Richardton and Watford City
1997: North Central School District Rock Lake, $302,000 for Global Computer Network
1998: Greater Barnes County (ITV) Consortium: Distance Learning Project Barnes County $144,015 Grant / $168,605 Loan
1999: MedCenter One, Bismarck, $300,000, Dakota Telemedicine System

Technology Opportunities Program
(Formerly Telecommunications Information and Infrastructure Assistance Program)
National Telecommunications and Information Administration
Department of Commerce

Purpose: To promote the development, widespread availability, and use of advanced telecommunications and information technologies to serve the public interest.

Range of Grants: Up to $600,00 over three years (2000 round)
In 1999 awarded $21.7 million to 99 projects ranging from $5,538 to $1 million

ND Grantees: 1994: State of North Dakota (ISD) ($137,500)
1995: Minot State University ($800,000)

1996: MedCenter One Health Systems ($400,000)
1997: Fort Berthold Community College ($234,350)
1997: Valley City State University ($123,368)
1998: Minot State University ($560,000)
1999: Mayville State University ($340,716)

STAR Schools
Office of Educational Research and Improvement
Department of Education

Purpose: Encourage improved instruction in math, science, languages, literacy skills, vocational education and to reach under-served populations through the use of telecommunications. Grants are made to telecommunication partnerships for facilities and equipment, educational and instructional programming, and technical assistance in the use of such facilities. Must be on statewide basis.

Range: Average is $2 million annually for five years.

Cycle One - 1988: Focused on the delivery of instructional programming for students located primarily in rural, isolated areas including Indian reservations and schools in the South.

Cycle Two - 1990: Services tended to focus on distance learning activities for students in grades five through eight and students in urban schools.

Cycle Three - 1992: Added dissemination projects that provided information and technical assistance agencies not using distance learning technologies; a statewide telecommunication project that provides two-way full motion interactive video and audio communication linking together public colleges and universities and secondary schools throughout the State; and an evaluation study of the Star Schools program.

Cycle Four - 1994: Focused on multi-media applications for elementary and secondary students in rural and urban schools. Special statewide and dissemination projects were funded and performance indicators were developed to assess the program's progress.

Cycle Five - 1996: Focused on increasing high school completion rates and enhancing adult literacy skills.

Cycle Six - 1997: Focused on multi-media applications for elementary and secondary students in rural and urban schools. A dissemination project was funded and the performance indicators will continue to evaluate the program's progress.

1999: Five projects were awarded nearly 2 million dollars annually for five years.
2000: High scoring unfunded applicants from 1999 will be selected.

ND Grantees: None

Technology Innovation Challenge Grants
Office of Educational Research & Improvement
Department of Education

Purpose: Focus on innovative uses of educational technology by building partnerships between local school districts, universities, businesses, libraries, software designers, and others. Partners in the Challenge Grants continue to match federal funds by well over three-to-one. In 1998, for the first time, new awards focused specifically on projects that developed or adopted innovative strategies to reach new and current teachers,

administrators, and other educators to help them use and integrate advanced technology to improve teaching. Goals are to promote the use of technology to support school reform, improve student learning, and support professional development.

Range: $500,000 to $2 million per year, average $1 million per year for five years

ND Grantees: 1997: NatureShift! Linking Learning to Life, Grand Forks Public School District ($4,501,936 over 5 years)

1998: Teaching with Technology Initiative, Bismarck Public School District ($7,282,557 over 5 years) When factored into 10,000 teachers, the $7 million is approximately $144.00 per teacher per year.

21st Century Community Learning Centers
Office of Educational Research and Improvement
Department of Education

Purpose: To enable rural elementary public K-12 schools or consortia of schools to plan and implement projects that benefit the educational, health, social services, cultural and recreational needs of the community.

Range of Grants: $35,000 to $2 million

2000: $454 Million available

ND Grantees: 1998: North Valley Vo-Tech Center, Grafton ($198,500 total)

1999: Minot Community Learning Center, Minot ($469,650-year 1)

GOALS 2000

(Also known as State and Local Education Systemic Improvement)
Office of Elementary and Secondary Education
Department of Education

Purpose: Goals 2000 awards grants to participating States and districts to support communities in the development and implementation of their own standards-based education reforms and concentrate on comprehensive change, school improvement, and achievement for all children. Goals 2000 supports the development of comprehensive reform plans for adopting high student standards and for aligning assessments and accountability, professional development efforts, and broad community involvement and coordination. Many states have utilized a portion of funding for technology activities.

ND Funding:	1994: $1,046,640	1995: $4,088,391
	1996: $3,800,805	1997: $5,300,049
	1998: $5,036,887	

Technology Literacy Challenge Fund
(Program is part of the GOALS 2000 Effort)
Office of Elementary and Secondary Education
Department of Education

Purpose: A five-year, $2 billion fund to provide formula grants to state education agencies to support grassroots efforts at the state and local level to meet the four national technology goals for schools: modern computers, high quality educational software, trained teachers, and affordable connections to the Internet. After the Technology Literacy Challenge Fund was launched in FY97 and funded at $200 million, it more than doubled with $425 million appropriated in FY98.

ND Funding: 1996-97: $1,000,000 1997-98: $2,125,000
1998-99: $2,125,000 1999-00: $2,125,000

The Community Technology Centers
Office of Vocational and Adult Education
Department of Education

Purpose: To provide access to computers and technology, particularly educational technology, to adults and children in low-income communities who otherwise would lack that access. These activities include the development of model programs, such as community technology centers, that demonstrate the educational effectiveness of technology in urban and rural areas and economically distressed communities.

1999: 40 grants totaling nearly $10 million

2000: Intend to award a total of $32.5 million to top scorers from 1999 applicants. An additional $101 million in new funds is currently earmarked for the program in President Clinton's FY2001 budget.

ND Grantees: None

Rural Telemedicine Grants
Health Resources & Services Administration
Department of Health and Human Services

Purpose: To demonstrate how telemedicine can be used to develop integrated systems of health care, improve access to health services for rural citizens and reduce the isolation of rural health care practitioners. The purpose is also to collect information for a systematic evaluation on the feasibility, costs, etc. of rural telemedicine.

Range: Average is $400,000, awards made annually with up to three year renewals.

ND Grantees: 1997: Northland Healthcare Alliance, St. Alexius TeleCare Network, Bismarck, $654,038

Rural Health Outreach Program

Office of Rural Health Policy
Department of Health and Human Services

Purpose: The Rural Health Outreach Grant Program funds projects to support the direct delivery of health care and related services, to expand existing services, or to enhance health service delivery through education, promotion, and prevention programs.

ND Grantees: 1997: ND Hospital Research and Education Foundation, Bismarck, Project TRANSCENDS (Distance education for LPNs), $582,089

1998: North Dakota State College of Science, Wahpeton, Distance delivery project, $450,000

Advanced Computational Infrastructure and Research Division
National Science Foundation

Purpose: The Division of Advanced Computational Infrastructure and Research provides access to, and support of, high-end computing infrastructure and research for the national scientific community.

ND Grantees: 1991: North Dakota State University, Fargo, enhanced the statewide academic telecommunications network, $655,000

Advanced Networking Infrastructure and Research
National Science Foundation

Purpose: The goals of these two programs are to support research in the technical areas relevant to understanding the global information infrastructure and to lay the basis for future advancements and to develop and enable the use of experimental advanced networks in broad support of the research and education community.

ND Grantees: 1995: United Tribes Technical College, Bismarck
Installed LANs for the 5 Tribal Community Colleges and connected them to NSF's network, $368,166

1997: Jamestown College, Jamestown, provided partial support for cable modem network to connect Jamestown's educational institutions to the Internet, $106,085

1998: North Dakota State University, Fargo, provided partial support for DS-3 connection for UND, NDSU and 3 South Dakota higher educational institutions, $2,292,118

Division of Educational System Reform

National Science Foundation

Purpose: The Division of Educational System reform (ESR) serves as a focal point for the Directorate's systemic reform efforts by managing large-scale programs designed to strengthen the science, mathematics and technology education (SMETE) infrastructure of states, urban centers, and rural areas.

ND Grantees: 1992: North Dakota Board of Higher Education, Bismarck
A portion of the grant seeks to build and strengthen partnerships between the community, tribal and 4 year colleges as well as high schools and junior high schools and the public through a science and engineering infrastructure, $5,200,000

1995: Turtle Mountain Community College, Belcourt, TMCC serves as the fiscal agent for 17 regional tribal college that will promote the development and use of technology as a teaching tool by establishing networks across the region, $10,336,718

Office of Experimental Programs to Stimulate Competitive Research

National Science Foundation

Purpose: EPSCoR, the Experimental Program to Stimulate Competitive Research, is based on the premise that universities and their science and engineering faculty and students are valuable resources that can potentially influence a state's development in the twenty-first century. EPSCoR's goal is to identify, develop, and utilize a state's academic science and technology resources in a way that will support wealth creation and a more productive and fulfilling way of life for a state's citizenry.

ND Grantees: 1995: North Dakota Board of Higher Education, Bismarck
Built upon the permanent infrastructure in science, engineering and mathematics through a Strategic Improvement Plan, $5,322,000

APPENDIX F

Key Telecommunications Forecasts[14]

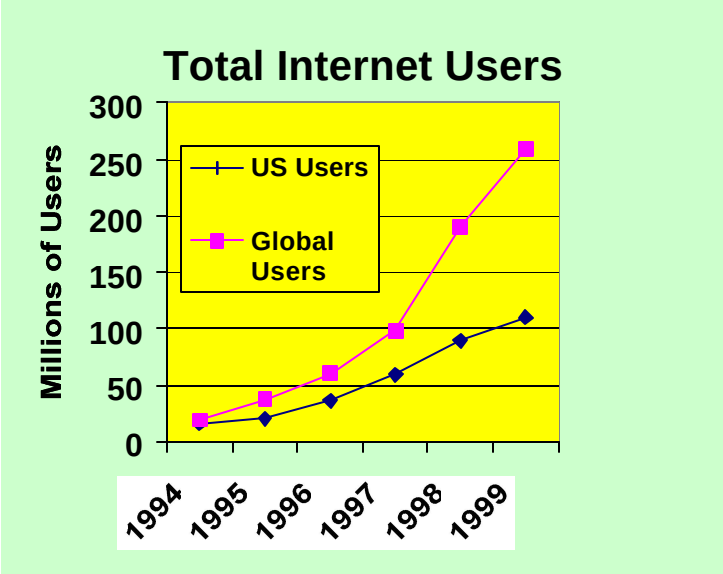
- The overall U.S. telecommunications market (equipment and services) grew by more than 11.4 percent in 1999, generating revenues of $517.6 billion.
- Total U.S. spending for telecom equipment and services will grow at an average rate of 11.3% to reach $794 billion in 2003.
- Spending on telecom equipment continued its double-digit growth by recording an 11.5 % increase over 1998 to reach $135.4 billion.
- Growth for transport services posted an 8.5 percent increase to $252 billion and support services posted a 17.3 percent increase to $138 billion.
- The fastest-growing equipment categories in 1999 include computer-telephone integration (CTI) hardware and software (up 66.2 percent over 1998); groupware (up 31.8 percent); videoconferencing equipment (up 14.3 percent); and network equipment and facilities (up 12.7 percent).
- Enterprise spending on professional and technical services in support of voice and data communications equipment rose 18.1 percent in 1999 to $116.4 billion.
- The largest dollar-value equipment category in 1999 was voice/data enterprise equipment, which totaled $75.8 billion, a healthy 11.5 percent increase over 1998.
- As with virtually all other aspects of the telecommunications industry in 1999 and in recent years, the fastest-growing categories have been those that provide equipment primarily or largely for high-speed data transmission. Double-digit increases were recorded for Ethernet switches, network management equipment, routers and operating systems. ATM, integrated services digital network and frame relay also posted double-digit gains. With respect to equipment primarily used for voice transmissions, voice processing (voice mail, interactive voice response, automatic call distributors and predictive dialing) showed the largest advance in 1999 with an 8.9 percent increase.

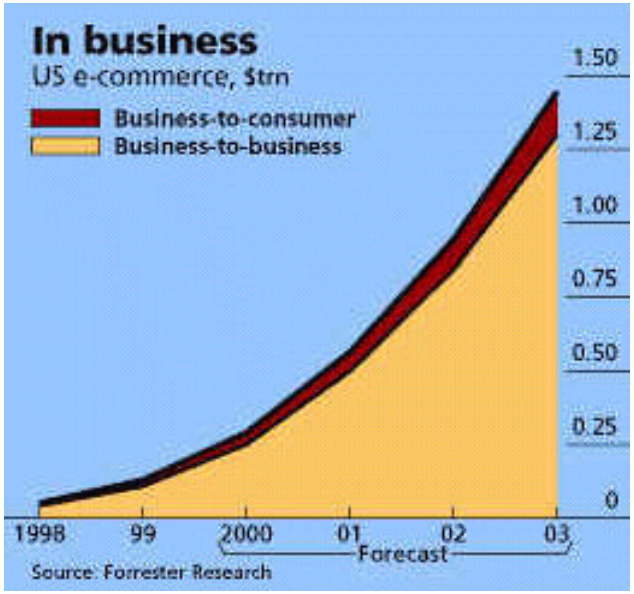
[14] MultiMedia Telecommunications Association, 2000.

APPENDIX G

Frequently Asked Questions

STATE OF NORTH DAKOTA
STATEWIDE TELECOMMUNICATIONS NETWORK PRIMER





Trends and Statistics

- Expect 500 million global Internet users by 2003
- Traffic on the Internet doubles every 100 days
- 73 million online shoppers in America in 1999 (up from 45 million in 1998)
- The Internet reached 30% of the U.S. population in 7 years, beating television (17 years), telephones (38 years), and electric service (46 years)
- Daily home usage grew by 50% in the last year - 57 million Americans use the Internet from home every day
- Conducting business online will save U.S. companies $360 to $480 billion / year by 2002 (Giga Information Group, 1999)
- Internet is cutting into TV viewing – Average Internet user spends 2.2 hours / day watching TV (4.3 / day for the average American)
- Internet users wasted an estimated 2.5 billion hours in 1998 waiting for web pages to download (Nua – European consulting and development firm, October 1999)
- 1.9 million Americans had broadband Internet access in 1999 and is expected to reach 16 million by 2002
- 2 of 3 children with access to a home computer use it for homework (NPD Online Research- Division of the NPD Group, Port Washington, NY, 1999)
- ND's state agencies, schools, cities, counties and NDUS spent approximately $19.8 million on voice, video and data services in 1998. Telecommunications expenditures have continued to increase between 5% and 300% annually

STATEWIDE TELECOMMUNICATIONS NETWORK
FREQUENTLY ASKED QUESTIONS

What is the statewide communications network?
The statewide communications network is an initiative to provide advanced voice, video and data services to state government, counties, cities, higher education, and school districts. Voice capabilities on the network will be utilized as capability and quality increases.

What is meant by voice, data, and video?
Voice services would include telephone and long distance services. Data includes Internet services and network connections among the agencies and institutions. Video services enable video conferencing and distance education initiatives. The term "telecommunications" pertains to all three. (Voice, video & data.)

Is the state actually building this network?
No. The state will be purchasing these services from telecommunication firms within the state.

What benefits do schools receive through the statewide network?
Providing advanced and affordable communications capabilities to our schools is a priority of this initiative. The ultimate vision of this network is to connect all 230 school districts and the North Dakota University System. The network will enable curriculum and resource sharing, provide distance learning opportunities, facilitate technology training and education, and provide high-speed Internet connectivity. The result will be enhanced educational opportunities for ND's students.

How much will this cost?
The exact costs for the network will be determined once the RFP responses have been received and contracts have been awarded. However, the State expects to spend less under this plan than would be spent if each institution proceeded on its own.

Why is the state providing leadership for this initiative?
State government is the largest purchaser of telecommunications services within North Dakota. With a unified approach to purchasing statewide communication for public institutions, the state will realize numerous benefits including:

1. **Advanced Communication Capabilities throughout the State –** The state network is expected to encourage the deployment of advanced telecommunications capabilities throughout the entire state. This will enable both public and private sector entities to obtain new technologies that would not be available on a timely basis with a disparate approach.
2. **Economic Development -** Economic development capabilities throughout the state will be enhanced. North Dakota's improved telecommunications infrastructure will augment business retention, expansion, and growth.
3. **Financial savings –** The joint purchasing power of the state will drive down overall communications costs for service recipients and create an environment for the private sector to purchase affordable telecommunications services.

Why is this important?
The State of North Dakota recognizes the importance of affordable, broadband communications services to the future of the state. Broadband services will enhance our educational capabilities, create new opportunities for job creation and economic development, as well as provide opportunities to create financial and technical efficiencies for state and local government. The goal is to speed deployment of new broadband services in all corners of the state to provide opportunities for all residents.

What is the status of this initiative?
The State's Information Technology Department (ITD) has issued an RFP to solicit bids from interested companies willing to provide these services. Responses to the RFP are due June 2, 2000. Contracts will be awarded on June 29, 2000 and implementation of the network is expected to start on August 7, 2000.