ICN Update

for the

Joint Meeting
Justice Systems
and
Oversight and Communications
Appropriations Subcommittees

March 14, 2002

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Executive Director

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ICN Table of Contents

IOWA COMMUNICATIONS NETWORK
REVENUE AND APPROPRIATION RECAP-ALL FUNDS
FOR THE FISCAL YEAR ENDING JUNE 30, 2003

Revenue/Appropriation Source		FY 2003 BUDGET REQUEST	
Debt Service		$ 12,855,000	
To pay annual recurring maintenance and fiber lease costs for installations occuring during years 1 through 4 of the Part III project.		$ 2,727,004	
Operating Revenues (fees paid to ICN by users)		$ 32,977,501	
Educational Video Subsidization		$ 1,234,330	
Migration of ICN backbone to ATM and MPEG2 technology	(FY2003)	$ 7,000,000	$ (5,000,000)

IOWA COMMUNICATIONS NETWORK
AMORTIZATION SCHEDULE
CERTIFICATES OF PARTICIPATION
FY 2003 THROUGH MATURITY

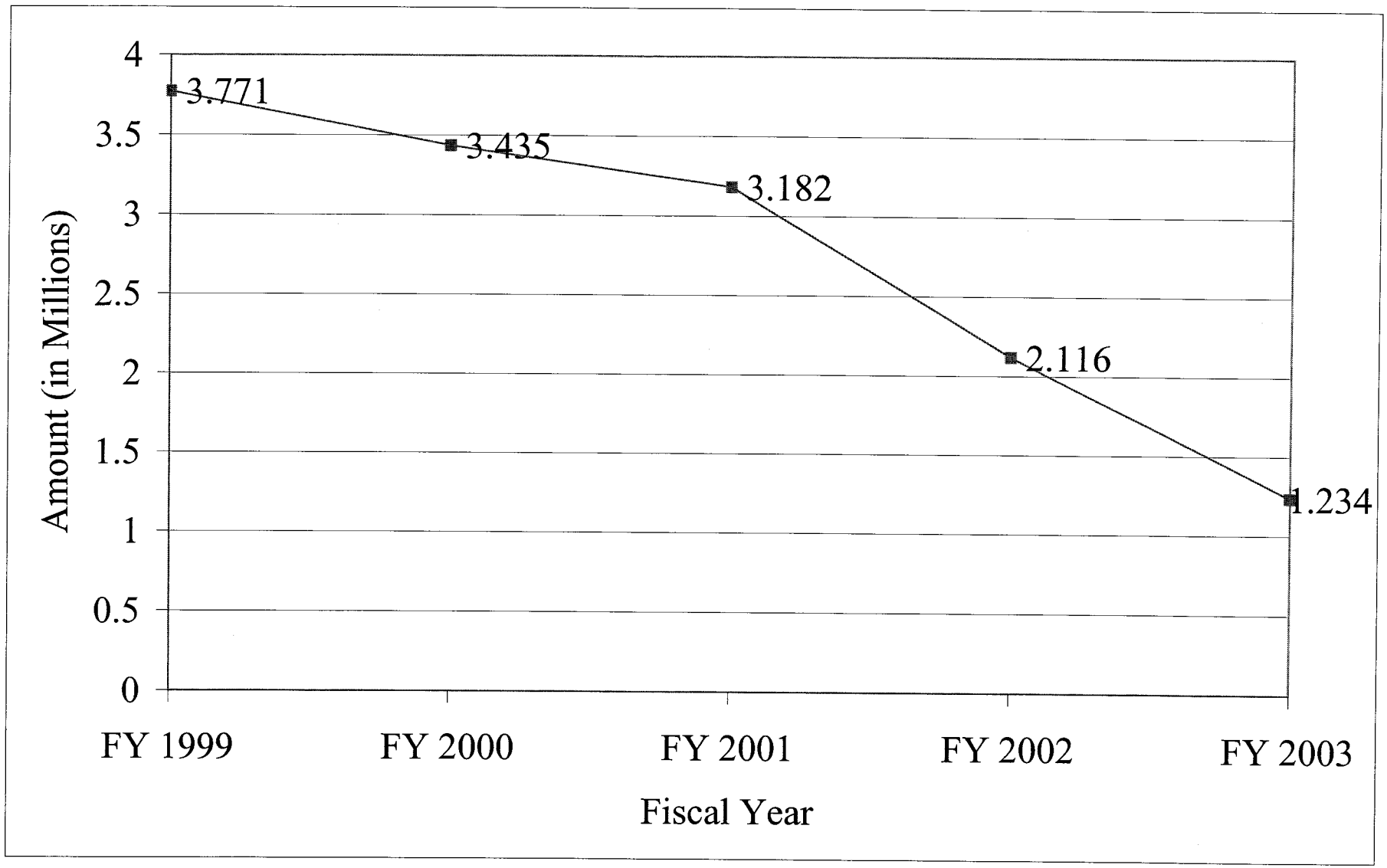
Maturity Date

1992A	07/01/2006
1993A	07/01/2006

Year Ending June 30,	Principal Balance	Principal	Interest	Total Payments
2003	47,195,000	10,125,000	3,286,448	13,411,448
2004	36,450,000	10,745,000	2,642,059	13,387,059
2005	25,035,000	11,415,000	1,944,556	13,359,556
2006	12,900,000	12,135,000	1,201,237	13,336,237
2007	-	12,900,000	408,829	13,308,829

Note: Funds for the payment due in FY 2007 are in escrow.

Iowa Communications Network
Video Subsidy
FY 1999 through FY 2003



IOWA COMMUNICATIONS NETWORK
PO BOX 587
JOHNSTON, IA 50131-0587

Universal Service Fund
Impact of Common Carrier Status

Background:

The ICN was designated as a common carrier in December 2000 qualifying it as a Universal Service Fund (USF) provider for eligible authorized users in FY 2002. Discounts for these users can be applied to all commercially available telecommunications service, Internet access, and internal connections.

USF Requirements:

Eligibility

- K-12 schools and libraries are eligible to receive discounts for their telecommunications services and internal wiring requirements from the USF using the ICN as their telecommunications provider.
- Discount percentages are based on eligibly for enrollment in hot lunch programs for the K-12 authorized users and the school's classification as urban or rural. The library rate is based on the percentage of student enrollment that is eligible for the national school lunch program in the public school district in which the library is located.
- All voice, data, and video services are eligible to be discounted but only if the school or library meets all of the application requirements and can only recover discounts up to the level of the approved estimate.
- The average discount in Iowa for eligible users is 59% of the normal telecommunications service charge.
- Discount rates range from 20% to 90% depending on the economic need and location (urban or rural)..
- The process for eligible users to enroll in the programs is as follows:

  Video Services
  - Beginning in filings for FY 03, an Iowa Consortium has been created by the Department of Education for one statewide filing for video services rather than having each school and library file separately.

  Other Services
  - Schools and libraries must enroll via a Form 470.
  - Eligible users must solicit bids for required telecommunications services.
  - Eligible users must submit estimates for usage of the services and estimated costs using a Form 471.
  - Eligible users must obtain approval by the Universal Service Administrative Company (USAC) and then submit Form 486 to verify receipt of services to USAC.

Billing

- Once the usage plan is approved by USAC, and the eligible user begins to use the approved service(s), the ICN applies the appropriate discount credit to the user's monthly billing and bills USAC for the balance of the credit.
- Payment by USAC is received approximately 120 days from the receipt of the bill. The ICN carries the debt on this discount from the billing date until payment is received.

ICN/State Recovery of Video Services Subsidization

- The ICN/State will not benefit from discounts received by eligible users on voice, Internet, and data services.

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- In the case of two-way, full motion video services, the ICN/State can recover the appropriate discount against the operational cost subsidized by the ICN through cross subsidization from other ICN services or by the subsidization appropriated by the State.

Estimated Financial Impact for FY 2002

The ICN is estimating $750,000 for the State's share of revenues from the Universal Service Fund for FY 2002.

FY 2003 Estimate

The ICN is estimating $1,785,000 for the State's share of revenues from the Universal Service Fund for FY 2003.

PART III LEASE AND MAINTENANCE APPROPRIATION

LEASE AND MAINTENANCE COST SUMMARY

Part III lease costs are made up of lease payments to vendors who were involved in the build-out of Part III sites. The fiber optic cable for Part III sites is not owned by ICN, rather the fiber for Part III sites is leased on a seven-year lease from the vendor installing the fiber. The first Part III sites installed by vendors were completed in FY 1996. The vendors were asked to submit bids for the seven-year leases, and these bids could be submitted in one of two different formats. 1) The vendors could submit bids with the installation and the seven-year lease costs as a lump sum paid upon completion of the site; or 2) The vendors could submit bids with a one-time installation cost paid upon completion and monthly recurring lease payments over the seven-year lease.

A large number of the Part III leased sites were awarded to McLeod (formerly known as MWR Telecom). MWR Telecom chose to submit bids under the first scenario with the lease cost included in the installation cost. While this scenario reduces the recurring lease cost during the first seven years, it does not account for the recurring lease cost of the fiber when the leases will need to be re-negotiated. ICN will need to start re-negotiating the leases expiring in FY 2003 during FY 2002. The following table is a summary of the total number of Part III lease sites. The chart details McLeod sites that do not have recurring lease costs and sites with lease costs that will need to be re-negotiated. This table also shows the fiscal year in which these recurring lease costs will need to be budgeted.

Part III Leased Sites
(Listed by Fiscal Year in which Leases will expire)
Table 1

Type of Part III Sites	FY 1996 Sites that Expire in FY 2003	FY 1997 Sites that Expire in FY 2004	FY 1998 Sites that Expire in FY 2005	FY 1999 Sites that Expire in FY 2006
McLeod sites	29	73	79	52
Other Sites with recurring lease costs that will need to be re-negotiated	39	34	52	18

Following is a summary of actual lease and maintenance costs for FY 1999, FY 2000 and FY 2001, and projected costs for FY 2002 through FY 2003.

Part III Lease and Maintenance Costs
FY 1999 through FY 2003
Table 2

Type of Cost	FY 1999 Actual	FY2000 Actual	FY 2001 Actual	FY 2002 Projected	FY 2003 Projected
Lease	$1,675,268	$1,681,685	$1,681,685	$1,681,685	$1,681,685
Maintenance	$996,194	$1,000,000	$1,045,319	$1,045,319	$1,045,319
Totals	**$2,671,462**	**$2,681,685**	**$2,727,004**	**$2,727,004**	**$2,727,004**

PART III RECURRING APPROPRIATION SUMMARY

Based on the information provided in the previous lease and maintenance summary, the Iowa Telecommunications and Technology Commission is requesting an appropriation in the amount of $2,727,004 for FY 2003.

The ICN will begin re-negotiating the Part III leased costs in FY 2003 for leases beginning in FY 2004. At that time, the ICN will evaluate the future lease costs associated with the Part III sites and adjust the recurring appropriation request for FY 2004 accordingly.

IOWA COMMUNICATIONS NETWORK
PO BOX 587
JOHNSTON, IA 50131-0587

ICN Upgrade Status

The ATM Upgrade Project when completed will convert the Iowa Communications Network from a star-on-star backbone transport topology to a five-ring transport topology deploying ATM at the core. The project will also convert over 755 full motion Interactive Distance Learning Classrooms from DS3 video codecs to MPEG-2/ATM codecs. The purpose of the upgrade is to replace equipment that has exceeded its industry standard shelf life, provide redundancy so transport is not interrupted if a portion of the network fails, and to more effectively utilize the bandwidth on the backbone and at each video site connection.

As of October 1, 2001 three of the five-backbone transport rings (Ring 1-Northwest Iowa, Ring 4- Southeast Iowa and Ring 5-Southwest Iowa) have been installed and 240 classrooms have been converted to MPEG-2/ATM codecs. These converted classrooms are located in Ring 5 (Creston and Council Bluffs Merged Areas) and Ring 1(Fort Dodge, Estherville, Sheldon and Sioux City Merged Areas). The ICN has installed a 60-link gateway at the STARC Hub to support the DS3 and MPEG-2/ATM hybrid videoconferences. This gateway is anticipated to maximize to 125 links (when half of the classrooms have been converted) and will decrease to zero links when all of the full motion classrooms have been converted to MPEG-2/ATM codecs. All of the required ATM switches for the upgrade project have been purchased.

The total cost of the upgrade was estimated to be $23 million when costed as a three-year project. Funding of $12.5 million was authorized for expenditure to begin the upgrade during the 1999 and 2000 legislative sessions. A $10.5 million request of the 2001 Legislature, to complete the ATM Upgrade, was reduced to a $3.5 million appropriation through the tobacco settlement bonds. This money became available in December 2001 and used to purchase the Ring-2 North Central Iowa and Ring-3 North East Iowa transport equipment. The $7 million, not yet appropriated, will be used to purchase the remaining 455 MPEG-2/ATM codecs to complete the conversion of the Rings 2, 3 & 4 video codecs and the upgrade project.

With the recent downturn of technology stock values and declining sales of technology vendor products, the codec vendor has expressed a willingness to offer a “one-time volume” price reduction to move their product. It is estimated that we could save up to $2 million if we could place an order for the 455 codecs yet this calendar year, thus reducing the final appropriation request of $5 million from the 2002 Legislature.

THE ATM UPGRADE

THE TRANSITION OF THE ICN NETWORK TO MPEG II VIDEO AND ATM TECHNOLOGY

Legislative Oversight Committee
Senator Steve King
Representative Libby Jacobs
Committee Co-Chairs

October 16, 1997

CONTENTS:

PRESENTED BY
TOMMY THOMPSON
CHIEF OPERATING OFFICER
IOWA COMMUNICATIONS NETWORK

SUMMARY

THE PROBLEMS

1. **NETWORK EXPANSION IS REQUIRED TO COMPLETE PART III.**

NEXT YEAR THE ICN WILL RUN OUT OF BACKBONE CIRCUITS ON AT LEAST SIX OF THE FIFTEEN TRUNK LINES.

2. **ICN SWITCHING REQUIREMENTS CANNOT BE MET BY THE CURRENT "GRASS VALLEY" SWITCHES.**

THE NUMBER OF CLASSROOMS CONNECTED TO THE CURRENT VIDEO SWITCHING PLATFORM WILL SOON EXCEED OUR SWITCHING CAPACITY.

3. **AGING LASER OPTICS MUST BE REPLACED OR THE NETWORK'S DEPENDABILITY WILL SUFFER.**

THE ONE-WAY LASER OPTICS EQUIPMENT IS NEARING THE END OF ITS LIFE CYCLE AND SHOULD BE REPLACED WITH TWO-WAY EQUIPMENT.

THE OPTIONS

1. *EXPAND THE CURRENT NETWORK DESIGN AT A COST OF $27.6 MILLION.*

2. *UPGRADE THE NETWORK TO A VALUE-ADDED DESIGN AT A COST OF $16 MILLION.*

THE RECOMMENDATION

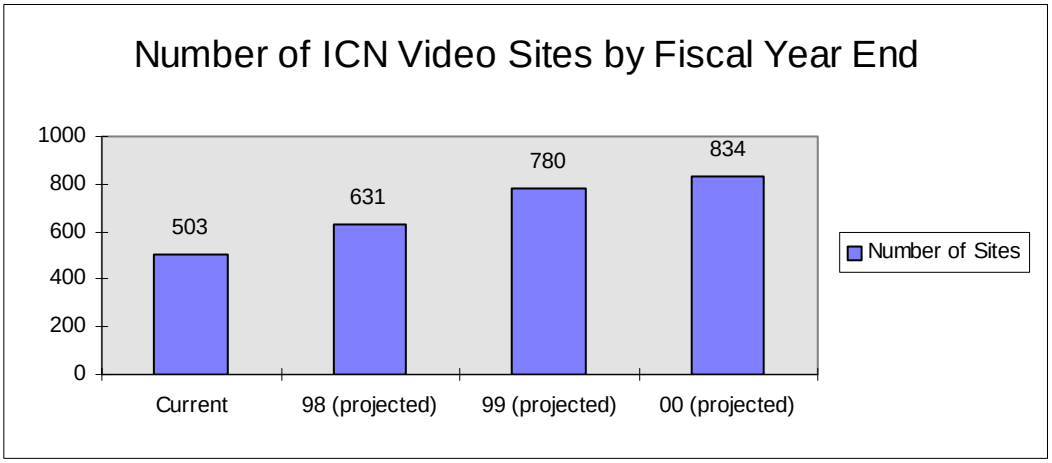
TRANSITION THE NETWORK TO A VALUE-ADDED DESIGN BEGINNING IN FISCAL YEAR 1999 BY ADOPTING AN ATM BACKBONE UPGRADE WITH THE INCORPORATION OF MPEG II TECHNOLOGY.

THE PROBLEMS

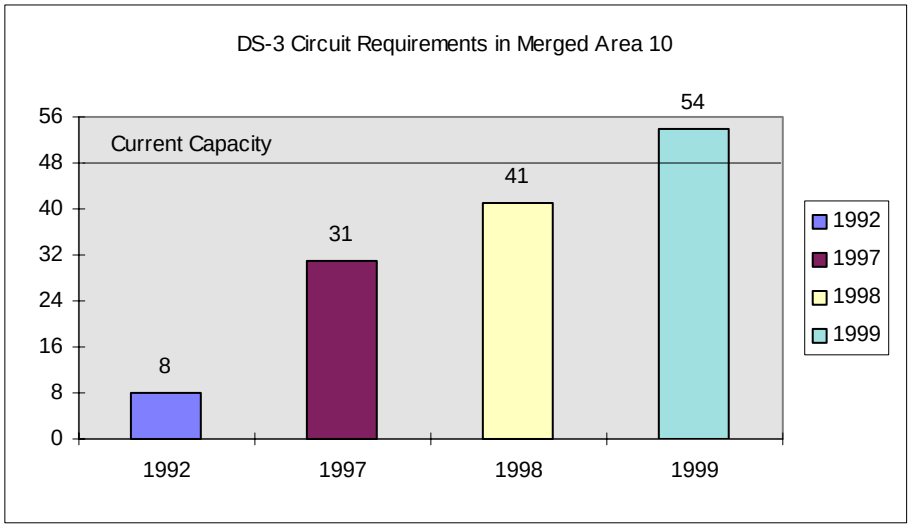
1. Network expansion is required to complete Part III.
In fiscal year 1999, the ICN will run out of backbone circuits on at least six of the fifteen trunk lines. This circuit shortfall is a direct result of the rapid growth of classroom connections beyond the Network's original design.

The most advanced technology available was used when the Network was first designed in 1990. Since then, many technological innovations have been made and the scope and size of the Network has changed. Although the ICN technology is still current in the industry, it does not meet the needs placed on the Network by the ICN users.

The Network was designed to accommodate 350 classrooms. This design was later revised to accommodate 500 classrooms. After Parts I and II of the Network were executed, independent colleges, federal agencies, hospitals and an expanded set of National Guard sites were added. This growth means that the ICN is projecting a total of 834 classrooms by the end of fiscal year 2000.



An example of this need to expand the Network's capacity is illustrated in Merged Area 10, Cedar Rapids. The chart on the next page shows that the original Network design provided eight DS-3s on one OC-48 termination device (one OC-48 device provides 48 DS-3 connections). Today there are 31 DS-3 connections in use and this number is expected to grow to 41 by the end of fiscal year 1998. In one more year Merged Area 10 will require 54 DS-3s, 6 more than can be provided in the current OC-48 cable.



To meet the projected circuit needs of the Network, decision makers have two choices:

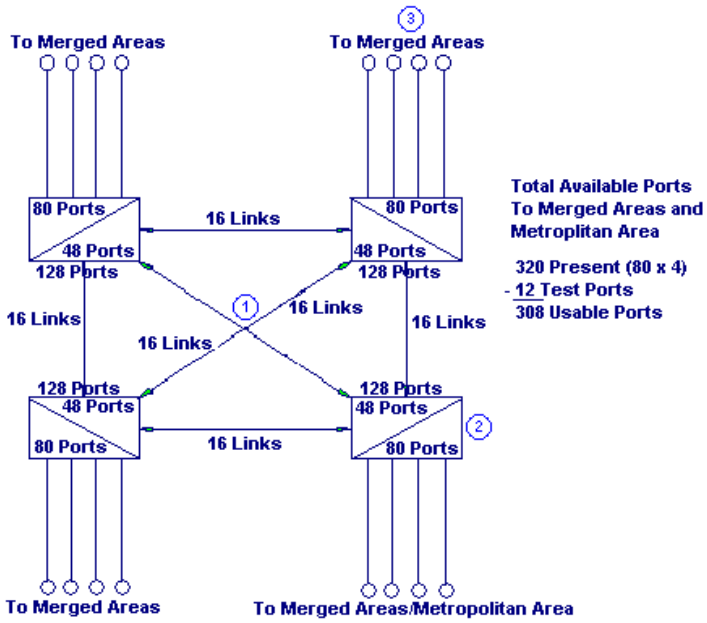
- Upgrade to a higher DS-3 capacity using a second OC-48 device together with an OC-192 device.
- Change the Network's technology to gain higher capacity efficiency from the existing design.

2. ICN's switching requirements cannot be met by its current "Grass Valley" switches.

The number of classrooms connected to the current video switching platform will soon exceed the ICN's switching capacity. The manufacturer (Grass Valley) does not provide any DS-3 switches that support the number of ports required to serve current and projected ICN classrooms. Recently, the ICN's only spare Grass Valley switch had to be used to replace a switch that was malfunctioning.

Video switching is currently provided by broadband video switches manufactured by Grass Valley Division of Tektronics, Inc. These switches are located at each of the 15 merged areas as well as one for the Des Moines metropolitan area and four at the hub. When the Network was designed, these were the only broadband video switches available that could handle a network as large as the ICN. The Grass Valley switch is still the only available switch that will handle the interactive DS-3 video protocol on very large video networks such as the ICN. If the ICN changes protocols to MPEG II, the port and switching problems will be alleviated since the demand for bandwidth on the trunk circuit will be greatly reduced.

The following drawing indicates the internal linkages as well as ports going out to the merged areas and metropolitan area.



1. Four 128-port switches are interconnected at the ICN Hub at STARC Armory.
2. Of the 128 ports available in each switch, 48 are used for internal linkages between the Hub switches and 80 are used for external linkages to the merged areas.
3. Each merged area is allotted 20 ports (for a total of 320 ports and each port can support 2 classrooms (for a total of 640 classrooms)

By fiscal year 1999, the ICN will require more ports for switching than are currently available using Grass Valley switches.

Simply adding more ports by adding more switches is not an acceptable solution. The ICN's current configuration optimizes transmission efficiencies, and adding more switches creates diminishing returns. As more switches are added at the Hub, more ports are used for internal linkages and fewer ports are available to the merged areas.

3. Aging laser optics must be replaced or the Network's dependability will suffer.

The laser optics equipment within the transmitters has an estimated life span of seven years. We are currently in year five of their use. Failure in the optics equipment will continue to increase,. as will maintenance costs, while the quality of transmissions will decrease.

The optical portion of the present transmission equipment is the one replaceable module in the equipment that has a historically calculated life span. These modules house the lasers and detectors that provide and sense the light on the fibers. As the optics approach the end of their usefulness, the light signals begin to lose intensity. Random circuit failures begin to occur as the receiver fails to accurately detect the incoming light signal. This creates interruptions in network transmission and take the Network down momentarily or permanently. Trouble shooting the circuit problem becomes very expensive as the problem randomly occurs and then corrects itself until it fails completely. This situation creates network unreliability and drives maintenance costs up sharply.

THE OPTIONS

1. Expand the current Network design: **$27.6 million**

- Add DS-3s to six merged areas
- Replace aging optics for nine merged areas
- Replace Hub Video Switch

Add DS-3s and Switching 6 X $3,196,000 Cedar Rapids, Ankeny, Council Bluffs, Sioux City, Des Moines, Ottumwa	$19,176,000
Optics Replacement (one-way - nine merged areas)	$ 3,928,059
Replace Hub Video Switch	$ 2,940,000
Installation	$ 1,604,440

2. Upgrade the Network to a value-added design: **$16.0 million**

- Replace current switches with ATM technology
- Replace aging optics
- Replace star-on-star topology with ring topology
- Change to MPEG II protocol
- Time the transition with the final year of Part III

ATM technology	$ 3,750,000
Optics upgrade *(two-way - 5 rings)*	$ 3,510,000
MPEG II video upgrade	$12,600,000
Network monitoring improvements	$ 1,075,000
Installation	$ 2,053,000
Estimated Savings (Appendix 1) (From combining the first year of the transition with the final year of Part III)	$ (6,947,396)

THE RECOMMENDATION AND ITS ADVANTAGES

The Iowa Telecommunications and Technology Commission and the ICN staff recommend the adoption of the ATM backbone upgrade with the incorporation of MPEG II technology to meet the growth and equipment replacement needs of the Network beginning in fiscal year 1999.

This transition includes:

- Changing the Network design from the current star-on-star topology to a five-ring topology.
- Replacing the Grass Valley video switches with ATM technology.
- Replacing the one-way optics with two-way optics.
- Replacing DS-3 codecs with MPEG II codecs.

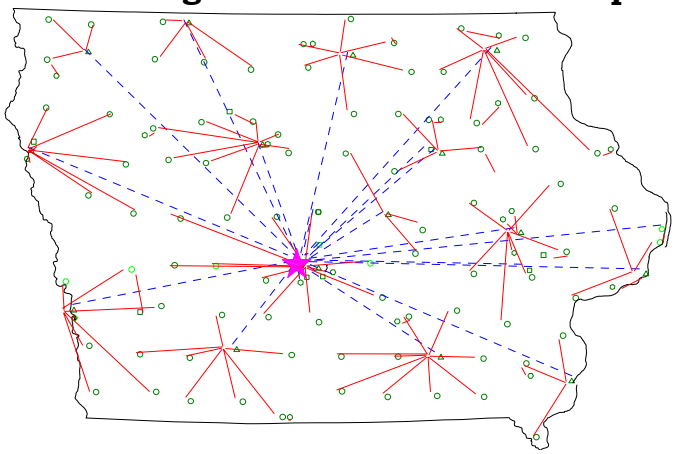
The Advantages

1. Bandwidth capacity is increased.
While ICN's transmission equipment is technologically current and must be maintained for economic reasons, the circuit structure cannot accommodate the projected growth. The Network's star-on-star topology provides a dedicated point-to-point connection between users. Whether the user is using the circuit or not, the DS-3 is dedicated to that user. When the user is not using the circuit, the bandwidth sits idle, and therefore is wasted.

The ATM conversion will provide "virtual" bandwidth for users. When the user is not using dedicated bandwidth, the extra bandwidth can become available to other on-line users. This ability to "share space" on the circuit increases the efficiency of existing capacity. (This can be accomplished in conjunction with the implementation of MPEG II codec upgrades.)

2. Network redundancy creates dependability.
The ICN was designed using star-on-star topology where one point is connected directly to many other secondary points, and these secondary points are connected to many other third order points. This design was chosen because it was the most economical, it was less complex and required the least amount of equipment, and a belief existed at that time that the educational network did not require redundancy.

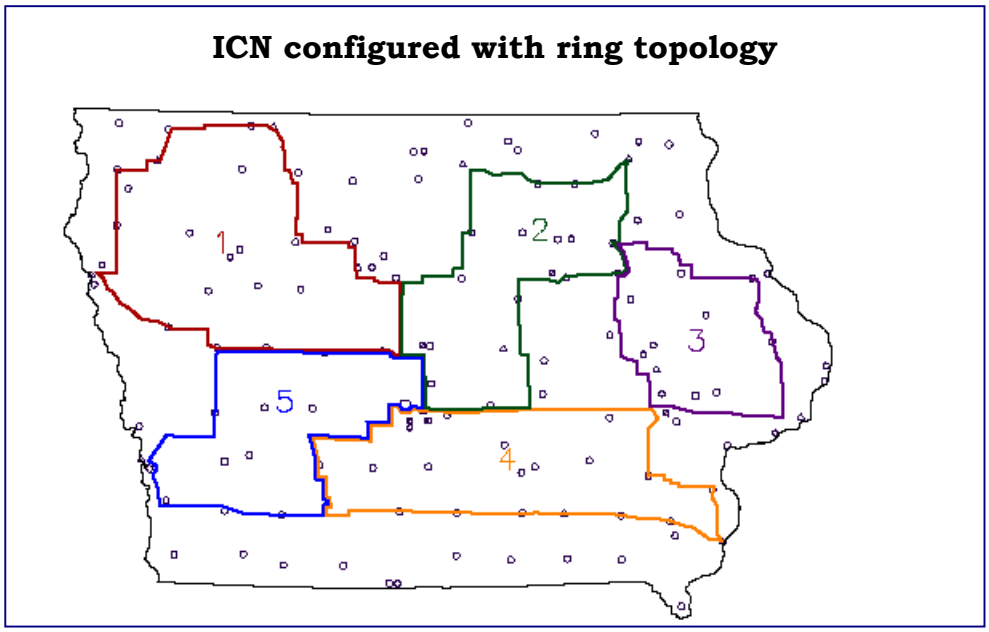
ICN configured with star-on-star topology



As new users with different needs were added to the Network, the requirement for redundant or protected circuits emerged. Uninterrupted high speed data transfer is critical for telemedicine, federal and state agencies, and universities. These users require protected circuits to prevent loss of service.

Loss of service is usually caused by equipment failure or cable cuts. Two different methods can be used to ensure cable path protection.

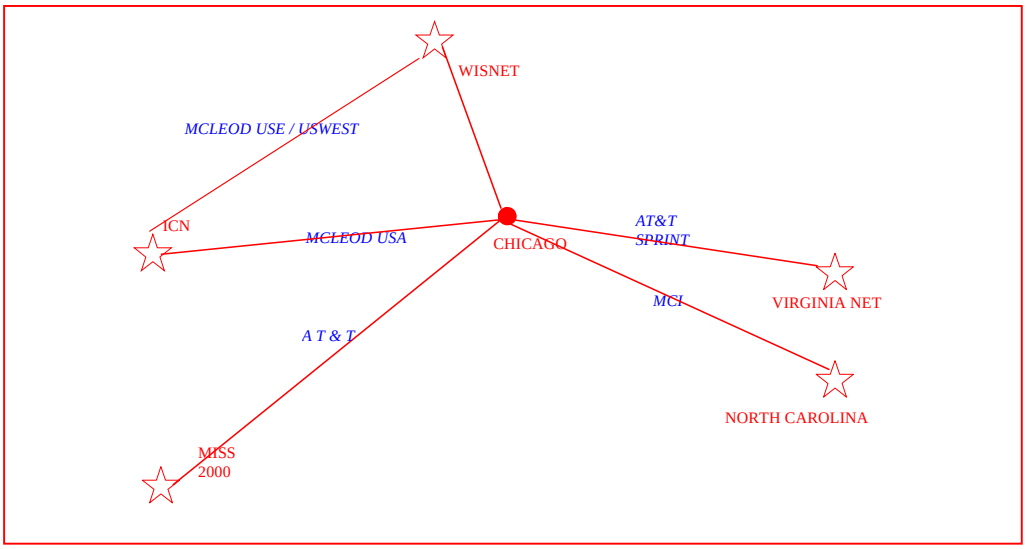
- First, contract with another telecommunications carrier to provide an auxiliary path. This method ensures protection but is not economical because it can double the cost of a network.
- Second, adopt a ring topology with two-way optics so that the transmission path can be in either direction. If a cable cut occurs, the optical equipment will detect the loss of transmission and automatically re-route the signal in the opposite direction to the user with no loss of data. The ring topology is depicted in the map on the next page.



Enough fiber exists in the ICN network to create the five-ring topology shown above. With the exception of a small 12-mile section in southwest Iowa, no additional cable needs to be laid to accomplish this transmission protection.

3. The ATM Upgrade aligns the Network with worldwide standards. No national standards for video technology existed before 1996. All vendors established their own technical standards that prevented any inter-connectivity between systems. In 1997, the MPEG II video technology was developed and is now being used as the worldwide industry standard.

MCI, Sprint, AT&T and other long distant carriers are upgrading their backbone networks to ATM technology that will adopt the MPEG II video protocol. The transition to standards-based video technology will allow users in Iowa to interface with out-of-state users on full-motion video connections. The diagram below indicates the kind of connectivity that could be achieved as the ICN maintains compatibility with this emerging industry standard.



4. Decentralized scheduling will be a beneficial consequence.
The ATM upgrade will decentralize the scheduling of the classrooms from Des Moines to the user's desktop.

Conclusion

The future of the ICN depends upon modifying the Network's technology to stay current with the ongoing changes occurring in the communications industry. Transitioning the ICN's video technology to MPEG II and at the same time adding ATM technology to the Network backbone assures that the ICN can accommodate the connectivity demands of current users. If a ring topology is adopted at the same time these two other changes are made, the ICN will be able to:

- Serve the projected number of users well into the future.
- Provide dependable service through network redundancy and two-way laser optic transmissions.
- Connect easily with other states and networks by using equipment that meets merging industry standards.

Finally, it is important to recognize the full potential of each of the component upgrades mentioned in this briefing paper cannot be realized unless the technologies are utilized in combination with each other. Two-way laser optics cannot perform their role unless they are installed in a ring topology. The efficiencies provided by MPEG II video codecs are lost without the ATM protocol. Together, these technologies help retain ICN's ability to provide all of the current and foreseeable future services and bandwidth required by users.

- Appendix 1

Estimated Savings

from

Combining the first year of the transition with the final year of Part III

Backbone buildout (STARC to Hub). "Plug in" equipment and terminal equipment to provide DS-3 trunks for Part III Sites	$	1,860,890
Additional regenerative equipment for backbone buildout	$	790,100
DS-3 video coders and decoders for Part III classrooms	$	1,728,300
Telephone circuit equipment to provide to control circuits for the Part III classrooms	$	883,670
DC power equipment of the Part III classrooms	$	465,500
Installation labor and materials to install and activate Part III sites	$	1,218,940
	$	6,947,400

IOWA COMMUNICATIONS NETWORK
For the Fiscal Year ending June 30, 2003
LINE OF BUSINESS BUDGET

	VIDEO SERVICES BUDGET		VOICE SERVICES BUDGET		DATA SERVICES BUDGET		Primary Line of Business Subtotal BUDGET		Other Services and Installations BUDGET		Budget Totals BUDGET	
	FTE	Allocation	FTE	Allocation	FTE	Allocation	FTE	Allocation	FTE	Allocation	FTE	Allocation
Revenues:												
Direct Revenues (billed to users)		4,435,117		13,059,475		9,228,201		26,722,793		6,254,708		32,977,501
Subsidization Appropriation		1,234,330		-		-		1,234,330		-		1,234,330
Total Revenues		5,669,447		13,059,475		9,228,201		27,957,123		6,254,708		34,211,831
Allocated Expenses:												
Variable Expenses												
LEC Circuit Charges		$ -		$ -		$ (5,439,584)		$ (5,439,584)		$ -		$ (5,439,584)
Switched Access Fees		-		(3,066,711)		-		(3,066,711)		-		(3,066,711)
Toll Provider Fees		-		(2,692,194)		-		(2,692,194)		(1,913,270)		(4,605,464)
Other Voice Direct Expenses				(2,032,298)				(2,032,298)				(2,032,298)
Installation Costs		-		-		-		-		(893,574)		(893,574)
Personnel Costs	20.0	(1,275,053)	40.1	(2,559,031)	19.3	(1,232,338)	79.5	(5,066,422)	25.5	(1,627,605)	105.0	(6,694,027)
Other Support Costs		(149,735)		(300,518)		(144,719)		(594,971)		(191,137)		(786,108)
Total Allocated Variable Expenses (Cash Basis)		(1,424,788)		(10,650,752)		(6,816,641)		(18,892,180)		(4,625,585)		(23,517,766)
Fixed Expenses												
System Maintenance		(3,360,084)		(656,521)		(564,868)		(4,581,473)		-		(4,581,473)
Technical Support Fees		(1,035,176)		(77,178)		(174,025)		(1,286,379)		-		(1,286,379)
Outside Plant Costs		(1,768,973)		(131,887)		(297,384)		(2,198,244)		-		(2,198,244)
Operating Expenses		(523,317)		(39,016)		(87,975)		(650,309)		-		(650,309)
Equipment for Administrative Operations		-		-		-		-		(350,500)		(350,500)
Equipment for Network upgrades and installations		(200,000)		(917,088)		(510,072)		(1,627,160)				(1,627,160)
Total Allocated Fixed Expenses (Cash basis)		(6,887,551)		(1,821,690)		(1,634,324)		(10,343,565)		(350,500)		(10,694,065)
Total Allocated Expenses (cash basis)		(8,312,339)		(12,472,442)		(8,450,964)		(29,235,745)		(4,976,085)		(34,211,831)
Net Income (Loss), before depreciation	20.0	(2,642,892)	40.1	587,033	19.3	777,237	79.5	(1,278,622)	25.5	1,278,623	105.0	0

Iowa Communications Network
Line of Business Budget Report

Description of Columns

The columns of the Line of Business Budget report summarizes and allocates the ICN's revenues and expenses by service. The report calculates the expected cash performance derived from each service. The ICN's primary line of business is derived from video services, voice services, and data services provided to the ICN's authorized users.

Column Name	***Description***
Video Services	The ICN provides full-motion interactive video services to its authorized users.
Voice Services	The ICN offers various voice services, including long distance, 800/888 service, international, line side services for capitol complex users and other supplemental services.
Data Services	The ICN provides data transmission services to its authorized users.
Primary Line of Business	The ICN's primary line of business includes video services, voice services, and data services. This accounts for approximately 82% of gross revenues and expenses.
Other Services and Installations	The ICN offers various subscription services include Internet gateway, IowaHub directory/enterprise messaging services, IPTV transmitter, and compressed video services. Revenues and expenses associated with installation of new services are accounted for in this column as well.
Budget Totals	This column summarizes the ICN budget for FY 2002.

Description of Rows

The rows of this report itemize revenues and expenses, variable expenses, and fixed expenses. The ICN accounts for expenses in two categories: variable expense and fixed expenses. The rows identify the type of expense being allocated and the source of the revenues. The following glossary gives definitions for the components of revenues, variable expenses, fixed expenses, and net income.

Revenues	***Description***
Direct Revenues	This represents billings to authorized users for services provided by the ICN.
Subsidization Appropriation	This represents the video subsidization appropriation.

Iowa Communications Network
Line of Business Budget Report

The following glossary explains the ICN's variable expenses in detail.

Expenses	*Description*
Variable Expenses	**Personnel costs and payments to local exchanges and inter-exchange carriers for usage are considered variable expenses. Variable expenses change as service production increases and decreases.**
LEC Circuit Charges	Payments to local exchange carriers (LECs) for leased circuits that carry data traffic from the ICN point of presence in each county to the authorized user's premise. Also referred to as tail circuits.
Switched Access Fees	Payments to LECs for termination charges associated with long distance service. Each time a subscriber places or receives a long distance call from within the state, the voice switch owned by the LEC is utilized, resulting in a charge per minute.
Toll Provider Fees	When a subscriber makes call to locations outside the state, the ICN must pass the call on to an inter-exchange carrier (IXC), resulting in a charge per minute. The ICN also leases two dedicated OC3s and one rate-limited OC3 at 100 megabit from Sprint, Genuity, and ATT for Internet access. Those costs are identified as other services and installations.
Other Voice Direct Expense	These are costs associated with PIC charges and provider payments related to the Universal Service fund and international services.
Installation Costs	These are costs associated with installing new services.
Personnel Costs	The ICN has 105 FTEs budgeted for FY 2003.
Other Support Costs	Costs associated with travel, training, supplies, legal fees, and other professional fees like data processing.

Iowa Communications Network
Line of Business Budget Report

The following glossary explains the ICN's fixed expenses in detail.

Expenses	*Description*
Fixed Expenses	**Fixed expenses are costs incurred regardless of the level of service production. Fixed expenses are allocated on the basis of the bandwidth within a given DS3 circuit required to provide service. One DS3 circuit allocates bandwidth as follows:** **Video 80%** **Data 14%** **Voice 6%**
System Maintenance	Costs of maintaining the ICN backbone and capitol complex voice switches.
Technical support fees	Costs for contracts for technical support.
Outside Plant costs	The costs of locating and relocating fiber due to major construction.
Operating Expenses	The costs include utilities, equipment repair and other miscellaneous operational expenses.
Equipment for Admin/Ops	ICN planned investments in printers, PCs, software, and local area network upgrades as well as necessary warehouse equipment.
Equipment for Network Upgrades and Installations	ICN planned investments in switch cards, upgrades to the DMS-500, VOSS upgrades, cache expansion, and troubleshooting tools. Also, equipment purchases required for installations requested by users.

The remaining rows calculate total allocated expenses and calculate the expected cash performance of each of the primary lines of business and other services.

For fiscal year 2003, the projected cash shortfall for video is $2,642,892. This shortfall will be compensated for through increased charges for voice, data and other services.

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IOWA COMMUNICATIONS NETWORK
TIME LINE OF THE ICN'S MAJOR EVENTS

April 15, 1991

Contract was issued to begin construction of ICN.

* Construction started during April, 1991.
* Original funding received from State of Iowa general fund.
* Original contract sum totaled $73,761,798.
* Construction of the Hub, and all Part I and Part II sites, both fiber optic cable and electronics.
* Change order #1 totaled $5,552,420 issued on June 28, 1991, which effectively raised the contract value to $79,314,218.

Use of Funds

Construction

Source of Funds

Appropriation

April 1, 1992

State of Iowa issues Certificates of Participation to fund construction

* Construction fund deposit totaled $72,207,746.
* Cost of issuance and other costs totaled $23,822,254.
* a/k/a COPs Series 1992A.
* Value of bond issuance was $96,030,000.
* Bonds were issued as serial notes with interest rates from 5.2% to 6.5%.
* First semi-annual interest payment due on July 1, 1992.
* First annual principal payment due on July 1, 1995.
* Certificates were issued as a lease purchase.
* Certificates were insured by AMBAC.
* Construction cost increased by $3,092,890, net due to change orders numbers 2 thru 4. Adds transmitter towers for IPTV to enable cost savings for Iowa.
* ICN was appropriated $2,902,500 to be used for construction costs and operations, equal to $2,486,152 and $416,348, respectively.

Use of Funds

N/A

Source of Funds

Bond proceeds

FY 1993

Change orders #5 thru 32 were issued during FY 1993.

* Construction cost increases by $12,487,828, net.
* Switching for voice services was added.
* Construction contract value increased to $94,894,936.
* ICN received a standing appropriation equal to $5,000,000 per year for five years.
* FY 1993 appropriation was used for debt service and other expenses.

Use of Funds

Construction
Operations

Source of Funds

Appropriation

July 1, 1993

Series 1993A of the COPS was issued by the State of Iowa to fund additional construction costs due to change orders.

* Construction fund deposit totaled $16,550,266.
* Cost of issuance and other costs totaled $2,004,293.
* a/k/a COPS Series 1993A.
* Value of bond issuance was $18,500,000.
* Bonds were issued as serial notes with interest rates of 3.65% to 5.45%.
* First semi-annual interest payment due on January 1, 1994.
* First annual principal payment due on July 1, 1995.
* Certificates were issued as a lease purchase.
* Certificates were insured by AMBAC.

Use of Funds

N/A

Source of Funds

Bond proceeds

November 1, 1993

Construction of the ICN was substantially complete. Service began.

* Substantial completion of the construction enabled ICN to recognize all fixed assets as income producing assets.
* This is the effective date of depreciation of the fixed assets.
* ICN began providing full motion interactive video services.
* Change orders #33 thru #37 were issued during FY 1994.
* Construction cost was increased by $1,581,134, net.
* Construction contract value increased to $96,476,070.
* Construction included fiber optic cable and electronics, as follows: (i) electronics valued at $40,491,304; and (ii) fiber optic cable valued at $62,269,302.

Use of Funds

Construction
Operations

Source of Funds

Appropriation
Receipts for Services

July 1, 1994

Chapter 8D became law with the passage of Senate File 2089.

* ITTC was formed.
* ICN became a separate agency.
* Start of FY 1995, after which ICN had its first financial statement audit.
* Change orders number 38 thru 40 were issued by ICN.
* Construction cost was increased by $411,819.
* Construction contract value increased to $96,887,889.
* ICN receives standing appropriation of $5,000,000. Used for debt service, operations, and equipment.
* ICN receives another appropriation of $5,600,000 specifically for debt service.
* ICN received a supplemental appropriation of $5,202,000 for the remainder of debt service and operations.

Use of Funds

Construction
Operations
Debt Service

Source of Funds

Appropriation
Receipts for Services

July 1, 1995

Approval to proceed with construction of Part III was granted by the 1995 G.A.

* Funding for Part III was approved in four installments from RIIF for construction.
* The FY 1996 appropriation totaled $18,500,000.
* ICN was not permitted to own the fiber optic cable to Part III end points.
* The budget for Part III provided for the: (i) purchase of equipment for backbone buildout; (ii) purchase of equipment for end points; (iii) the installation of fiber cable and/or DS3 circuits to the site(s); (iv) on going lease costs of the fiber optic cable or DS3 circuits, and (v) maintenance on the equipment purchases.
* Total budget was projected at $94,689,658, as follows:
  (i) $20,329,688
  (ii) $15,634,858
  (iii) $39,040,714
  (iv) $12,179,502, and
  (v) $7,504,896
* Construction for Part III began on July 1, 1995, and is proceeding through the end of calendar year 1999.
* The 1995 G.A. repealed the standing appropriation. At this point, subsidization of full motion video services began.

Use of Funds

Construction
Operations
Debt Service

Source of Funds

Appropriation
Receipts for Services

Last Updated 03/12/2002

IOWA COMMUNICATIONS NETWORK
TIME LINE OF THE ICN'S MAJOR EVENTS

November 8. 1996

ICN and DGS agreed to reassign the responsibility for capitol complex voice and data services from DGS to ICN.

* Transition occurred via a Memorandum of Under-standing between the agencies.
* Legislation was offered during the 1996 G.A. to statutorily approve the merger.
* Included the reassignment of 19 FTE's.
* Included the transfer of a revolving fund, formerly known as: Telephone Revolving Fund (#656)
* ICN received its second Part III appropriation in the amount of $20,800,000

Use of Funds

Construction
Operations
Debt Service

Source of Funds

Appropriation
Receipts for Services
Fund Transfer

July 1, 1997

ICN merges the funds and assets of the former DGS voice and data services into ICN's funds and assets.

* The statutory effective date of the merger was July 1, 1997.
* Effectively transferred FTE's, office equipment and telecommunications equipment to ICN.
* ICN received its third Part III appropriation in the amount of $22,641,000
* The remaining fund balance in Fund 656 was merged with ICN, which totaled $2,693,883.

Use of Funds

Construction
Operations
Debt Service

Source of Funds

Appropriation
Receipts for Services
Fund Transfer

July 1, 1998

ICN and the Iowa National Guard reach an agreement to transfer ownership of ING owned fiber optic cable and equipment to ICN.

* In FY 1999, ICN will assume ownership of all fiber optic cable and electronic equipment owned by ING.
* The cable and equipment was installed during FY 1996 as a result of ING's installation of 58 video classrooms throughout the state of Iowa.
* Effectively transfers fixed assets and maintenance responsibilities.
* ICN received its fourth Part III appropriation in the amount of $18,904,000

Use of Funds

Construction
Operations
Debt Service

Source of Funds

Appropriation
Receipts for Services

July 1, 1999

ICN converts software and hardware to accommodate the year 2000 transition and begins a major upgrade of the network to ATM/MPEGII tech

* In FY 2000, ICN replaced all of its major network software systems for Y2K compliance
* All routers were upgraded for Y2K compliance.
* ICN completed a new automated billing system and began a comprehensive circuit audit for all state agencies.
* Phase I of ATM/MPEG II conversion was completed for the SW Iowa Ring.
* ICN received its fifth Part III appropriation in the amount of $2,681,685

Use of Funds

Construction
Operations
Debt Service

Source of Funds

Appropriation
Receipts for Services

July 1, 2000

ICN was designated as a common carrier by the FCC. ICN continued ATM/MPEG II network upgrade and continued revision of billing system.

* In FY 2001, ICN completed Phase II of the network upgrade including the NW Iowa Ring and partially completed the SE Iowa Ring.
* The ICN completed circuit audits.
* ICN expanded the Internet gateway to multiple providers and multiple OC3 connections.
* The ICN was designated as a common carrier and began planning for FY 2002 Universal Service Fund administration.
* ICN received its sixth Part III appropriation in the amount of $2,727,004

Use of Funds

Construction
Operations
Debt Service

Source of Funds

Appropriation
Receipts for Services

July 1, 2001

ICN creates Strategic Advisory Committee with private sector. Continues network ugrade and creates consortium for K-12 educational video discounts.

* In FY 2002, ICN will complete Phase III of the network upgrade including the North Central Iowa Ring.
* ICN begins drawing Universal Service Funds for all services reducing operations appropriations to $2.2 million.
* ICN and Dept. of Education creates a consortium for Universal Service Fund administration for video usage for K-12 schools.
* ICN participates in Alliance for Advanced Telecommuni-cations Services and creates a strategic advisory committee with the private sector and a process to be used in acquiring new or changing services in the future.
* ICN received its seventh Part III appropriation in the amount of $2,727,004

Use of Funds

Construction
Operations
Debt Service

Source of Funds

Appropriation
Receipts for Services

Last Updated 03/12/2002

IOWA COMMUNICATIONS NETWORK
ASSET ADDITION AND DEPRECIATION SINCE INCEPTION

Asset Useful Life	Event	July 1, 1993 to June 30, 1996			July 1, 1996 to June 30, 1997			July 1, 1997 to June 30, 1998			July 1, 1998 to June 30, 1999			July 1, 1999 to June 30, 2000			July 1, 2000 to June 30, 2001		
		Asset Cost	Annual Depreciation	Net Asset Value	Asset Cost	Annual Depreciation	Net Asset Value	Asset Cost	Annual Depreciation	Net Asset Value	Asset Cost	Annual Depreciation	Net Asset Value	Asset Cost	Annual Depreciation	Net Asset Value	Asset Cost	Annual Depreciation	Net Asset Value
Three year [1]	November 1, 1993	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	July 1, 1994 (ICN formation)	8,207	4,104	4,104	-	2,736	1,368	-	1,368	-	-	-	-	-	-	-	-	-	-
	July 1, 1995 (Part III Yr. 1)	410,334	46,515	363,819	-	136,778	227,041	-	136,778	90,263	-	90,263	-	-	-	-	-	-	-
	July 1, 1996 (Part III Yr. 2)	-	-	-	307,825	100,047	207,778	-	102,608	105,170	-	102,608	2,562	-	2,562	-	-	-	-
	July 1, 1997 (DGS Merger)	-	-	-	-	-	-	40,258	22,239	18,019	-	13,419	4,600	-	4,600	-	-	-	-
	July 1, 1997 (Part III Yr. 3)	-	-	-	-	-	-	564,771	22,193	542,577	-	28,552	514,025	-	95,223	418,802	(374,129)	44,673	-
	July 1, 1997 (Adjustment)	-	-	-	-	-	-	-	344,824	(344,824)	-	-	(344,824)	-	-	(344,824)	344,824	-	-
	July 1, 1998 (ING Transfer)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	July 1, 1998 (Part III Yr. 4)	-	-	-	-	-	-	-	-	-	427,513	87,496	340,017	-	150,561	189,456	-	71,439	118,018
	July 1, 1999 (Part III Yr. 5/ATM 1)	-	-	-	-	-	-	-	-	-	-	-	-	20,678	3,866	16,812	-	6,499	10,313
	July 1, 2000 (Part III Yr. 6/ATM 2)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	46,477	2,115	44,363
	July 1, 2001 (Part III Yr. 7/ATM 3)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Asset Value			$ 367,923			$ 436,187			$ 411,206			$ 516,381			$ 280,247			$ 172,693
Five year [2]	November 1, 1993	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	July 1, 1994 (ICN formation)	41,678	8,336	33,342	-	8,336	25,006	-	8,336	16,670	-	12,452	4,218	-	4,218	-	-	-	-
	July 1, 1995 (Part III Yr. 1)	188,792	33,153	155,639	-	37,758	117,880	-	37,754	80,126	-	38,614	41,512	-	16,930	24,582	(24,582)	-	-
	July 1, 1996 (Part III Yr. 2)	-	-	-	24,026	2,496	21,530	-	4,805	16,725	-	4,805	11,920	-	5,594	6,326	-	5,595	731.00
	July 1, 1997 (DGS Merger)	-	-	-	-	-	-	27,442	17,985	9,457	-	790	8,667	-	5,488	3,179	-	3,179	-
	July 1, 1997 (Part III Yr. 3)	-	-	-	-	-	-	772,477	46,223	726,255	-	154,441	571,814	-	116,000	455,814	-	(8,509)	464,323
	July 1, 1997 (Adjustment)	-	-	-	-	-	-	-	64,787	(64,787)	-	-	(64,787)	-	-	(64,787)	24,582	(40,205)	-
	July 1, 1998 (ING Transfer)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	July 1, 1998 (Part III Yr. 4)	-	-	-	-	-	-	-	-	-	59,067	5,484	53,583	-	11,813	41,770	-	10,298	31,472
	July 1, 1999 (Part III Yr. 5/ATM 1)	-	-	-	-	-	-	-	-	-	-	-	-	34,662	4,483	30,179	-	11,495	18,684
	July 1, 2000 (Part III Yr. 6/ATM 2)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3,803	1,268	2,535
	July 1, 2001 (Part III Yr. 7/ATM 3)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Asset Value			$ 188,981			$ 164,416			$ 784,446			$ 626,927			$ 497,063			$ 517,745
Seven year [3]	November 1, 1993	40,491,304	15,793,727	24,697,577	-	5,784,472	18,913,105	-	5,784,472	13,128,633	-	5,103,453	8,025,180	-	4,134,899	3,890,281	(3,890,281)	-	-
	July 1, 1994 (ICN formation)	954,818	204,604	750,214	-	136,403	613,811	-	136,403	477,408	-	266,781	210,627	-	210,627	-	-	-	-
	FY 1994 Overstatement	(4,178,116)	(287,836)	(3,890,281)	-	-	(3,890,281)	-	-	(3,890,281)	-	-	(3,890,281)	-	-	(3,890,281)	3,890,281	-	-
	July 1, 1995 (Part III Yr. 1)	10,173,135	96,948	10,076,187	-	1,453,305	8,622,882	-	1,453,305	7,169,577	-	1,661,662	5,507,915	-	1,661,330	3,846,585	-	2,376,291	1,470,294
	July 1, 1996 (Part III Yr. 2)	-	-	-	14,134,784	362,398	13,772,386	-	1,619,255	12,153,131	-	1,704,393	10,448,738	-	2,244,789	8,203,949	-	2,244,683	5,959,266
	July 1, 1997 (DGS Merger)	-	-	-	-	-	-	5,042,481	2,901,843	2,140,638	-	316,932	1,823,706	-	720,354	1,103,352	-	720,354	382,998
	July 1, 1997 (Part III Yr. 3)	-	-	-	-	-	-	4,832,851	202,563	4,630,288	-	633,074	3,997,214	-	690,407	3,306,807	-	690,407	2,616,400
	July 1, 1997 (Adjustment)	-	-	-	-	-	-	-	(401,331)	401,331	-	57,333	343,998	-	57,333	286,665	-	57,333	229,332
	July 1, 1998 (ING Transfer)	-	-	-	-	-	-	-	-	-	2,204,032	314,862	1,889,170	-	314,862	1,574,308	-	314,862	1,259,446
	July 1, 1998 (Part III Yr. 4)	-	-	-	-	-	-	-	-	-	6,538,627	725,494	5,813,133	-	936,267	4,876,866	-	934,090	3,942,776
	July 1, 1999 (Part III Yr. 5/ATM 1)	-	-	-	-	-	-	-	-	-	-	-	-	10,787,519	946,434	9,841,085	-	1,541,074	8,300,011
	July 1, 2000 (Part III Yr. 6/ATM 2)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2,917,004	571,919	2,345,085
	July 1, 2000 (Inventory Adjustment)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6,429,502	-	6,429,502
	July 1, 2001 (Part III Yr. 7/ATM 3)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Asset Value			$ 31,633,698			$ 38,031,904			$ 36,210,726			$ 34,169,401			$ 33,039,618			$ 32,935,110
Twenty year [4]	November 1, 1993	62,269,302	8,575,764	53,693,537	-	3,113,465	50,580,072	-	3,113,465	47,466,607	-	3,113,711	44,352,896	-	3,115,713	41,237,183	-	2,668,980	38,568,203
	July 1, 1994 (ICN formation)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	July 1, 1995 (Part III Yr. 1)	2,118,389	23,788	2,094,602	(1,858,729)	(30,333)	266,205	-	12,983	253,222	-	12,983	240,239	-	12,983	227,256	-	105,919	121,337
	July 1, 1996 (Part III Yr. 2)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	July 1, 1997 (DGS Merger)	-	-	-	-	-	-	6,962	1,421	5,541	-	348	5,193	-	348	4,845	-	4,845	-
	July 1, 1997 (Part III Yr. 3)	-	-	-	-	-	-	633,497	16,973	616,524	-	31,327	585,197	-	31,327	553,870	-	(61,261)	615,131
	July 1, 1997 (Adjustment)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	July 1, 1998 (ING Transfer)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	July 1, 1998 (Part III Yr. 4)	-	-	-	-	-	-	-	-	-	78,201	3,528	74,673	-	3,910	70,763	-	4,223	66,540
	July 1, 1999 (Part III Yr. 5/ATM 1)	-	-	-	-	-	-	-	-	-	-	-	-	137,333	6,243	131,090	-	6,867	124,223
	July 1, 2000 (Part III Yr. 6/ATM 2)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	July 1, 2001 (Part III Yr. 7/ATM 3)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Asset Value			$ 55,788,139			$ 50,846,278			$ 48,341,895			$ 45,258,199			$ 42,225,008			$ 39,495,435
	TOTAL ICN ASSET VALUE			$ 87,978,740			$ 89,478,784			$ 85,748,272			$ 80,570,907			$ 76,041,935			$ 73,120,983
	TOTAL ICN DEPRECIATION		$ 24,499,103			$ 11,107,862			$ 15,651,252			$ 14,484,805			$ 15,509,164			$ 12,288,432	
	TOTAL CAPITAL INVESTMENT FOR PERIOD										**$ 146,313,929**	**$ 65,743,022**	**$ 80,570,907**	**$ 157,294,121**	**$ 81,252,186**	**$ 76,041,935**	**$ 166,661,601**	**$ 93,540,618**	**$ 73,120,983**
	APPROPRIATIONS (RECOGNIZED AS INCOME)																		
	"OPERATIONAL" APPROPRIATIONS [5]			$ 4,658,185			$ 2,400,000			$ 3,770,000			$ 3,735,000			$ 3,435,000			$ 3,181,920
	CONSTRUCTION APPROPRIATIONS [5]			$ -			$ -			$ -			$ -			$ -			$ -
	INTEREST EXPENSE APPROPRIATIONS [5]			$ 5,467,000			$ 5,166,421			$ 4,811,763			$ 4,368,307			$ 3,852,783			$ 3,820,000
	PART III "EXPENSE" APPROPRIATIONS [5]			$ 7,613,933			$ 13,536,634			$ 17,217,981			$ 18,923,848			$ 2,839,906			$ 6,527,004
	TOTAL APPROPRIATIONS FOR PERIOD												**$ 104,603,572**			**$ 114,731,261**			**$ 128,260,185**
	OTHER INVESTMENT COSTS																		
	COST OF ISSUANCE FOR COP's			$ -			$ -			$ -			**$ 25,826,547**			**$ 25,826,547**			**$ 25,826,547**
	GROSS ICN INVESTMENT TO DATE [6]												**$ 276,744,048**			**$ 297,851,929**			**$ 320,748,333**

Footnotes:

1 Three Year Assets are comprised of traditional office use technology assets, including computers, file servers, and other LAN equipment.

2 Five Year Assets are comprised of traditional office furniture and equipment, including modular furniture, desks, chairs, copy machines, etc.

3 Seven Year Assets are comprised of communications technology (service producing) equipment, including fiber optic transmission equipment, telecommunication switches, etc.

4 Twenty Year Assets are comprised of fiber optic cable (i.e. "dark fiber")

5 Appropriations are listed by year

6 Gross ICN Investment to date represents the sum of: (i) TOTAL CAPITAL INVESTMENT FOR PERIOD; (ii) TOTAL APPROPRIATIONS FOR PERIOD; and (iii) COST OF ISSUANCE FOR COP's

COST/BENEFIT ANALYSIS
IOWA COMMUNICATIONS NETWORK
FY 2001

Other states and countries marvel at the telecommunications infrastructure in the Iowa Communications Network ICN). At a time when Iowa's revenues are low, Iowans can rest assured that this telecommunications asset is a financial boon to the State. Iowans receive an annual financial savings/benefit of 199% compared to the annualized cost to the State of operating the ICN.

Following are the facts and figures that tell the financial story of the benefits the ICN brought to the State and its citizens during fiscal year (FY) 2001.

Significant FY 01 ICN Statistics

Annualized FY01 savings/ benefit over costs or return on investment	**199%**
Annual savings on services (ICN vs. private provider rates) Appendix D	**$ 34.6 Million**
Cumulative external grants/federal investment/USF (ICN related) Appendix C	**$120.8 Million**
Annual Savings by state agencies by use of the Network Appendix F	**$ 8.79 Million**
Annual travel savings by higher education students Appendix E	**$625,298**
Cumulative appropriations to ICN through FY 2001	**$320,748,333**

The ICN budget for FY 2001 was $48.7 Million. Following is a table indicating allocations to the private sector for services, maintenance and support, as well as, for payment of the debt service on Certificates of Participation issued in 1992 and 1993 to finance the construction of the backbone of the ICN.

FY 01 ICN Budget

Total revenues		**$ 48,743,628**
Services provided by private sector		**$(17,877,761)**
Telecom services purchased from private sector	**$(12,343,122)**	
Pass-through customer installations	**$(2,807,635)**	
Leased Part III tail circuits	**$(2,727,004)**	
True ICN costs to State for operations		**$(30,865,867)**
Debt service on ICN backbone	**$(12,860,000)**	
Maintenance/tech support from private sector (Appendix B)	**$(7,451,822)**	
Personnel/Network equipment/administration (Appendix B)	**$(10,465,978)**	
Carry Over to FY 02		**$(88,067)**

Return on Investment

To determine ICN's return on investment to the State, the true cost for Network operations was calculated. This cost is the gross revenues realized with the "pass-through" telecom expenses extracted. The true cost is then compared to the savings or benefits realized by having the ICN owned by the State. Many federal projects and various grants have been awarded to the ICN/ICN users because of the capacity available on the Network for tests, demonstrations and uses.

ROI – Annualized Cost/Benefit

True State cost for the Network				**$ 30.8**	**Million**
	Total ICN budget for FY 01	$ 48.7	**Million**		
	Pass through telecom expenses (Appendix B)	**(17.8)**	**Million**		
Annual savings and benefits achieved by having the ICN infrastructure				**$61.3**	**Million**
	Savings by agencies and users	$ 9.4	Million		
	Annual external dollars attracted (Appendix A)	$17.3	Million		
	Annual savings on services (ICN vs. private provider rates) (Appendix E)	$34.6	Million		

FY 01 Return on Investment

Equals – **Annual savings and benefits achieved by the ICN infrastructure** / **True State cost for the Network**

= $61.3 Million / $30.8 Million or 199%

To calculate the return on investment utilizing the annualized cost benefit method, the realized savings/benefits Iowa experiences by having the ICN infrastructure is divided by the true State cost for the Network to operate. This calculation shown at the left indicates that the State is realizing a return of investment from the ICN infrastructure of 199% for FY 2001.

Additional cost of services without ICN infrastructure

Equals - **The realized savings/ benefits realized due to the ICN minus True State cost for the Network**

= $61.3 Million - **$30.8 Million or $30.5 Million**

In other words, if the Network was eliminated, the cost to the State for the same services, if available, and benefits to the State and Iowans would be almost two times more than the State's investment in FY 2001 or an additional cost of $30.5 Million to the State of Iowa.

Future Projections

Projecting the return on investment in FY 07, using the same computations as above, the computation will reflect a return of investment of 356% as the debt service and leased Part III tail circuit costs will no longer be required.

Projected FY 07 ICN Budget

Total Revenues (paid by users no appropriated funding)		**$33,156,624**
Expenses to private sector		**$(15,150,757)**
Telecom services required from private sector	**$(12,343,122)**	
Pass-through customer installations	**$(2,807,635)**	
True ICN costs to the State for operation		**$(17,917,800)**
Maintenance/tech support from private sector (Appendix B)	**$(7,451,822)**	
Personnel/Network equipment/administration	**$(10,465,978)**	
Carry over to next fiscal year		**$88,067**

Assumptions:

- **Same annual revenue as FY01 from users - $33.2 Million**
- **Same annual outside savings/benefits as FY 01**
- **Same annual agency/user savings as FY01**
- **Total FY 07 ICN budget of $33.2 Million**

Projected Return on Investment FY 07

Equals – **Annual savings/benefits achieved by the ICN Infrastructure** / **True State cost for the ICN**

= $61.3 Million / $17.2 Million , 356% or $44.1 Million.

External Investments / Dollars Attracted because of ICN Infrastructure Through FY 01

Initiatives to Date	Type	Amount	
Federal initiative tests 1996-98	Federal appropriation	$19.0	Million
STAR Schools 1992-2001	Federal appropriation	$43.7	Million
National Guard classrooms	Federal appropriation	$9.6	Million
National Guard initiatives 2000-2001	Federal appropriation	$23.0	Million
Various users	Grants (Appendix E)	$24.0	Million
Universal Service Fund (K - 12 & libraries)	Discounts/reimbursements	$1.5	Million
Universal Service Fund (health care)	Discounts/reimbursements	$0.028	Million
		$120.8	Million

Annualized external dollars attracted= 120.8/7 years of ICN existence = $17.3 Million

FY 01 Revenue/ Expenses

Revenue

Operating budget		
		$33,156,624
Part III tail circuit appropriation		2,727,004
Debt service appropriation for Parts I and II		12,860,000
Total Revenue		**$48,743,628**

Expenses

Paid to private telecom sector for services		
		$12,343,122
Paid to private sector for lease of Part III tail circuits		2,727,004
Paid to private sector for installations/ services		2,807,635
Telecom services required from private sector	*	**$17,877,761**
Paid to Private providers for Network maintenance		$4,520,798
Paid to Private providers for Technical Support		1,548,690
Paid to Private providers for fiber related expense		1,382,334
Maintenance/tech support from private sector	*	**$7,451,822**
Total direct "pass-through" to private sector*	**$25,329,583**	
Personnel expense (105 FTEs)		$6,076,817
Equipment purchase support for users and Network		3,501,639
General administrative expenses		887,522
Personnel/Network equip/ administration		**$10,465,978**
Debt service annual payments		**$12,860,000**
Carry over to FY 2002		**$88,067**

Grants

Date	Grant Recipient	Grant Provider	Grant Type	Amount	Description
4/94-3/97	U of I Hospitals and Clinics	National Library of Medicine	Telemedicine	$7,250,000	Development of Telemedicine network to 3 rural Hospitals.
1996-97	U of I Hospitals and Clinics	GSA	Telemedicine	$120,000	Build out telemedicine network and add 4 more hospitals
1998	U of I Hospitals and Clinics	GSA	Telemedicine	$120,000	Build out telemedicine network and add 5 more hospitals
10/96-12/01	U of I Hospitals and Clinics	National Library of Medicine	Telemedicine	$6,400,000	Develop and deliver patient education programs into homes.
1996-97	U of I Hospitals and Clinics	Agency of Health Care Policy Research	Telemedicine	$30,000	Two-day conference on telehealth
1995-96	U of I Hospitals and Clinics	Astra-Merck	Telemedicine	$5,000	Develop materials for teaching health care providers on video conferencing.
1999-2000	U of I Hospitals and Clinics/Dr. Tom Scholz	Wal Mart/Children's Miracle Network	Telemedicine	$100,000	Expansion of pediatric cardiology telemedicine network
9/2000-6/2001	U of I Hospitals and Clinics	Various pharmaceutical companies (Astra-Zeneca, Genentech, UCB Pharma etc	Telemedicine	$12,500	Support UI faculty who use video conferencing to deliver timely updates on diagnosis and treatment to rural and isolated health care providers
1994-2001	MRTC	Federal Government	Telemedicine	$8,202,000	Funding of network to serve rural Iowa
	Sioux County Courthouse	Federal Byren Grants, USDA,	Telejustice	$55,350	Connecting Sioux County Courthouse to ICN
4-year	Indian Hills Community College	Federal Title III Grant	Education	$1,700,000	Improve services to distance education students.
Total				$23,994,850	

Appendix D

Savings on Services

ICN vs. Private Provider Rates

Service	Annual Savings to State of Iowa	
*Capitol complex telephone service	$2.3	Million
*Full-motion video service (300,000 hours)	27.0	Million
*Voice service	2.4	Million
*Data services	1.7	Million
*Internet service	1.2	Million
Total Estimated Annual Savings	**$34.6**	**Million**

Appendix E

Estimated Student Travel Savings

Higher Ed

	# Sessions	Students at Remote Sites	Savings Realized
Community College	342	2,900	$258,557
Private Colleges/Universities	76	724	$ 64,090
Regents Institutions	111	2780	$302,650
Total	530	6,404	$625,297

Assumptions:

# of students at remote sites	2.5 Community College Students 4 Private College and University Students 5 Regents Students
Miles Saved (round trip)	12.75 Community College Students 25 Regents and Private College Students
Cost per mile	$0.29

Department Name	Dollars Saved in FY 2001	
Agriculture	$ 116,610.00	
Board of Regents	$ 3,674,927.00	
Civil Rights Commission	$ 4,783.83	
College Student Aid Commission	No response	
Commerce	$ 147,962.55	
Corrections	$ 38,728.09	
Cultural Affairs	No savings to the dept./ savings to users	
Department for the Blind	Did not use	
Department of Management	No response	
Economic Development	No response	
Education	$ 1,459,575.88	
Elder Affairs	No response	
Ethics & Campaign Disclosure Board	No response	
General Services	No response	
Governor's Alliance on Substance Abuse	$ 53,082.32	
Governor's Office	$ -	
Human Rights	$ 54,377.00	
Human Services	$ 718,474.13	
Information Technology Department	$ 524.90	
Inspections & Appeals	$ -	
Iowa Communications Network	$ 18,802.18	
Iowa Finance Authority	No response	
Iowa Public Television	$ 1,030,931.00	Savings to K-12 schools
Iowa State Penitentiary	No response	
Ipers	$ 376.34	
Judicial Branch/State Court Administrato	No response	
Justice Department	No response	
Law Enforcement Academy	No response	
Mental Health Institute Independence	$ 1,334.60	
Natural Resources	No response	
Parole Board	No response	
Personnel	$ 236,749.24	
Public Defense	$ 299,631.91	Includes $75,663.10 cost avoidance to Iowa soldiers
Public Health	$ (11,472.80)	Does not include savings to local entites or Iowans who have additional access to the Department's services
Public Safety	No response	
Racing and Gaming	$ -	
Revenue and Finance	$ 3,333.50	
Secretary of State	No State Savings Used for Training or Public Input	
State Library of Iowa	$ 228,247.79	
Transportation	$ 212.00	
Treasurer	$ -	
Veterans Affairs Commission	No response	
Veterans Home	$ 31,706.04	
Vocational Rehabilitation	$ 59,805.00	
Workforce Development	$ 622,487.06	
Total savings	**$ 8,791,189.56**	

Glossary

ATM (Asynchronous Transfer Mode) - Transmission protocol that uses very short fixed-length (53 bytes) packets or cells to carry voice, data, and video signals. By using a standard cell size, ATM can switch data via software and route and switch its traffic at higher speeds. ATM creates virtual circuits which are established for "actual use" times only. ICN is currently implementing an upgrade to ATM with MPEG 2 compression.

Audio Conference - Feature of voice service which provides the ability for multiple callers to dial into a line which allows for group communication.

Backbone (ICN) - Includes the Hub in Johnston, the centralized switching center of the Network, interconnecting the Hub with all Part I and Part II endpoints throughout the state by digital links for two-way transmission of 45 Mbps video, voice, and data for state, education, and administrative purposes as defined in the Iowa Code, chapter 8D. Iowa's fiber optic network backbone is like the trunk of a tree with many branches reaching out to communication sites.

Bandwidth - Measurement of capacity which determines the rate information can be transmitted across the medium over time. These rates are measured in bits (bps), kilobits (kbps), megabits (Mbps), or gigabits (gbps) per second. Typical transmission services are 64 kbps, 1.544 Mbps (T-1), and 45 Mbps (T-3).

bps - (Bits per second) Number of binary digits transmitted per second in a data communications system.

Broadband - Facility or circuit that has bandwidth in excess of that required for high-grade voice communication.

Channel - Communication path established between two or more institutions.

Codec (coder/decoder) – A duplex integrated circuit that performs both analog-to-digital conversion and digital to analog conversion. In the current ICN upgrade DS-3 codecs are being replaced with MPEG-2 codecs.

Compressed Video - Compression involves the elimination of real video frames. Compression occurs in all video services. Compressed video on the ICN refers to video services utilizing a T-1 circuit (1.544 Mbps) or less bandwidth (typically 384 kbps).

DAX (Digital Exchange) - Computerized digital cross connect that allows one or more

specific channels from high-capacity lines to be split out separately and redirected.

DCC-45 (Digital Cross Connect) - Switch within the ICN that connects full-motion video classrooms.

Dedicated Line - Permanent direct connections between two telephone lines or PBXs. The route and circuit are always available to the person who leases or owns the line and the signal does not need to be switched.

Dialtone - Dialtone to a technician means that the switching office serving your telephone is ready to receive address information on your call. Dialtone to the layperson means that a tone is being sent to your telephone by the switching office verifying that an electrical path is complete and is now awaiting your dialing instructions. Dialtone is not always necessary for telephone service. For instance, some cellular service vendors do not use dialtone at all. In addition, dialtone can serve as an effective trouble indicator, as an electrical impairment on your telephone line will, in most cases, also affect dialtone.

Dial-up - Process of, or the facilities involved in, establishing a temporary connection via a switched telephone network.

Digital - Binary (zero or one) output of a computer or terminal in data communications. Modems convert the pulsating digital sounds into analog waves for transmission over conventional telephone lines.

Direct Connect Call - ICN service which allows an agency, directly connected to the ICN, to call other direct connect agencies without assistance of local exchange switching facilities. There is a savings of $.02 per minute in connecting in this manner. However, this service does require a minimum of $1,000 per month in gross long-distance tolls to be cost effective.

Distance Education - Ability to establish a learning situation across wide geographical distances. Teacher and students may be located in two or more classrooms. With fiber optics capability, participants may interact in a two-way voice and video interactive environment.

DMS 500 (Digital Multiplex System) - Switching system used for all of the voice, data, and dialable wideband video services offered by the ICN.

DS-0 - Digital equivalent of one normal telephone line (64 kbs signal). Measures the speed information can be transmitted.

DS-1 - Digital signal for 1.544 mbps. Digital transmission format in which 24 telephone line equivalents are multiplexed into one DS-1 channel. Measures the speed information can be transmitted. Video transmitted at this speed is 1/28th of the DS-3.

DS-3 - Digital signal for 44.736 Mbps. Telephone term describing the 44.736 Mbps

signal carried on a DS-3 facility. One DS-3 equals 28 DS-1s or 672 DS-0s. Measures the speed information can be transmitted. A DS-3 and a T-3 are equivalent. Video transmitted at this speed approximates full-motion.

Equal Access - ICN standard to provide equal educational, medical, and governmental opportunities to Iowa citizens statewide through the use of advanced telecommunications services.

Exchange - Switching center, or the area where a common carrier furnishes service at the exchange rate. Under required regulations, exchange rates must be prescribed in the carrier's filed tariffs.

Fiber Optics - Technology using thin strands of glass to propagate transmission signals. The maximum bandwidth at which a fiber optic cable can transmit signals has yet to be determined.

FOTS (Fiber Optic Terminal System) - Each ICN site has a FOTS room where fiber enters the building. The FOTS room equipment converts light-to-digital and digital-to-analog signals. It also separates types of services such as voice, data, and video.

Frame Relay - Communications method for connecting computer systems (Wide Area Networks) that transmits bursts of data. The data is divided and compressed into packets of information allowing more than one person to access the same physical circuit simultaneously.

Full-Motion Video - Video channel ranging between 8 and 39 Mbps wide. ICN's premiere service provided as connections for broadcast quality images and sound capable of real time interactivity between multiple sites.

Gateway - An endpoint on the network that supports real-time communication between other endpoints or terminals that have dissimilar capabilities. This includes supporting voice communication between terminals on a packet, (e.g., Internet Protocol (IP) network) and terminals on a circuit, (e.g. Public Switched Telephone Network).

Hub - Centralized switching center of a network. The ICN HUB is located at the STARC Armory in Johnston.

ICN - Iowa Communications Network.

IEC or IXC (Interexchange Carrier) - Any carrier registered with the FCC authorized to carry customer transmissions between LATAs interstate. In addition, if approved by a state public utility commission, intrastate which includes carriers such as AT&T Communications, MCI, and US Sprint.

Interactive - Live communications with either two-way audio and video or two-way audio and one-way video, providing for question-and-answer capabilities. ICN two-way

video is interactive.

Interactive Video - Capability to transmit and receive two-way video transmissions between originating site and remote classrooms. ICN two-way video is interactive.

Internet - Network of computer networks, linking computers from colleges and universities, government agencies, institutions and commercial organizations worldwide. The largest international computer network.

Internet Subscription - ICN service which provides access to the Internet via a gateway router.

IowaHub Subscription - ICN service which provides e-mail package translation, word processing document attachment translation, and directory listing features between disparate e-mail software systems.

ISDN (Integrated Services Digital Network) - ICN service that allows a variety of switched digital data and voice transmissions to be accommodated simultaneously. Networking concept that provides subscribers with end-to-end fully digital communications.

ITTC (Iowa Telecommunications and Technology Commission) - Governing body of the ICN established by Senate File 2089 during the 1994 Legislative session. Made up of five voting members, appointed by the Governor and confirmed by the Senate, with the State Auditor as an ex-officio member.

LAN (Local Area Network) - User-owned, user-operated, high-volume data transmission facility connecting a number of communicating devices (computers, terminals, printers, etc.) within a single room, building, or campus.

LATA - (Local Access Transport Area) Geographic service area where long distance service within the LATA is provided by the LEC. Long distance service between LATAs is provided by an IEC.

LEC - (Local Exchange Carrier) Carrier providing local services to customers within a LATA.

mbps - (Mega Bits per Second) Measure of the number of bits of data transmitted in a second, where Mega (M) is one million bits.

MPEG-2 - A video compression technology using codecs with a variable bandwidth setting of 1.5 mbps to 18 mbps versus the 39 mbps required by the current DS-3 codecs. Use of less bandwidth by the codecs allows bandwidth for additional video classrooms or other applications.

Multiplexer/Mux - Equipment that allows two or more signals to pass over and share a

common transmission path.

Narrowcast - Transmission of programs to a specifically defined audience normally using the newer technology delivery systems. Sometimes referred to as a target audience, a limited audience, or a “narrow” audience, hence the name “Narrowcast."

Network (the) - Iowa Communications Network consists of the Hub (STARC Armory); interconnecting the Hub with all Part I endpoints (regional switching centers, Regents Institutions, and other Part I endpoints); Part II endpoints (secondary switching centers); and Part III end points consisting of schools, libraries, and area education agencies. Includes state and federal government administration sites.

Part I - Involved the installation of a Network Control Center at the STARC Armory in Johnston and the linking of Iowa’s three Regents Universities, 15 community colleges, Iowa Public Television, and the State Capitol Complex.

Part II - Involved creating a point of presence in each of the remaining 84 Iowa counties by connecting to the 15 community colleges.

Part III - Involved expanding the Network to other authorized users within the counties, such as schools, libraries, and area education agencies.

Point-to-Point - Circuit that directly connects two points. There are generally no intermediate processing nodes nor computers, although there could be switching facilities (e.g., a phone line circuit that links two and only two logical entities).

PVC (Permanent Virtual Circuit) - Virtual circuit that is a logical rather than a physical connection between end points. Using virtual circuits, multiple logical connections can be established across a single physical path.

Real-Time - Capture, processing, and presentation of data at the time the data is originated.

Regional Switching Centers - Part I endpoints providing interconnectivity for Part II endpoints and Part III endpoints.

Ring Topology - Network structure whereby connection between devices is accomplished by arranging them in a physical ring. This ring configuration allows redundancy by allowing traffic to flow either direction around the ring.

Router - Sophisticated, protocol-specific device that passes data between LANs by examining the data and selecting the most efficient of all available routes.

SONET (Synchronous Optical Network) - American and international standard for transmission of digital signals.

SDE (System Development Engineer) - ICN staff who serve authorized users by consulting on technologies and addressing ICN service issues. Each SDE serves a specific region or user group.

Switch - Computers or electromechanical devices that connect transmissions to their destination points.

T-1 - Part of transmission service providing a transmission rate of 1.544 Mbps or equivalent to 24 DS-0 circuits.

Telecommunications - Communications process that allows the transmission of information from a sender to a receiver by means of an electromagnetic or lightwave medium.

Teleconferencing - Conference of two or more people linked by telecommunications. It can be audio only, video one way and audio the other, or video both ways.

Telejustice - Use of a telecommunications system for conducting both state and federal judicial proceedings such as hearings and revocations.

Telemedicine - Use of a telecommunications system for purposes of health care. Of special importance to Iowa, telemedicine can link rural hospitals to and provide rapid transmission of X-ray film, CT head scans, and ultrasound studies to remote site specialists.

Token Ring - Local area network access mechanism and ring topology in which a supervisory frame or token is passed from station to adjacent station sequentially. Stations wishing to gain access to the network must wait for the token to arrive before transmitting data. In a token ring, the next logical station receiving the token is also the next physical station on the ring.

Topology - Overall configuration of a network.

Traffic - Volume and intensity of transmitted signals on a communications channel.

Transmission - Sending and receiving of a telecommunications signal.

Video Conferencing - Real-time, usually two-way, transmission of digitized video images between two or more locations.

Virtual Circuit - Network facilities that give the appearance of an actual end-to-end circuit in packet switching. A dynamically variable network connection where sequential user data packets may be routed differently.

Voice over Internet Protocol (IP) - The transport of digitized speech in Internet Protocol packets. The speech may be part of a real-time conversation or a non-real-time transaction such as voice mail. The speech may be digitized by any of a large number of

standard or proprietary voice coding schemes; however, compatible coding is required at both ends of the connection. The IP network may be the public Internet or a private IP-based network. The voice transport service could be phone-to-phone, computer-to-phone or computer-to-computer. Phone connections require an interface to the Public Switched Telephone Network (PSTN) via a gateway.

Voice Service - ICN service which provides inbound and/or outbound calling ability.

WAN (Wide Area Network) - Network of computer devices separated by a large geographical area. Normally, connects a series of local area networks or agency communications equipment located throughout the state.

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