

Advanced Engineering Taskforce Report

2005



Message - Gary E. Wenger, Chair, Advanced Engineering Taskforce

The ICN is a telecommunications backbone providing high-speed access to data, video, and audio communications in K-12 schools, libraries, colleges and universities, museums, and local government and state agencies. The network serves the needs of Illinoisans for education, training, and information technologies.

During this last year the ICN/AET had many accomplishments including:

- Subcommittees on e-rate compliance within the ICN & Telecom legislation rewrite
- Initiated the creation of a member benefits sheet for the ICN
- Conducted a survey of ICN constituents on the use of content providers
- Increased attendance at meetings by implementing an attendance requirement
- ICN established antivirus contract pricing and is working on anti-spam
- Renewal of Cisco contract for another 2 years
- Hiring of additional staff for the RTCs to fill vacancies
- Cost recovery approved for FY2006 with no changes
- Expanded the "Best Practices" website

One of the accomplishments from this past year included an itemization of member benefits. These items included:

- *Experience 99% reliability on the largest private network in the state providing all the "perks" like real time traffic management, network services, upgrades, and repairs to over 7,000 institutions.*
- *Just a few hops away from thousands of Illinois schools, libraries, museums and government organizations as part of the "Illinois Intranet".*
- *Full range of services including Connectivity Consultation, Domain Name (DNS) Hosting, Internet Connectivity, IP Addressing, and Monitoring/Analysis.*
- *Educational institutions can participate in Internet2, the research network that is a partnership of academia, industry and government*
- *Centralized content filtering from Secure Computing (formerly N2H2) that users control from a web interface, to help with CIPA compliance.*
- *Access to broadcast quality video from CSPAN, PBS, NASA and hundreds of others across a multicast enabled backbone and caching services to greatly reduce the time it takes to download what you need.*
- *Rest easy with 24/7/365 monitoring and support for any kind of trouble via a statewide Network Operations Center. Get local support from one of nine Regional Technology Centers located around the state.*
- *Save big money on Cisco equipment (42.5%) and SmartNet maintenance (30%) thanks to ICN negotiated contracts with SBC. Save even more with discounts on T-1 and DS3 leased circuits from SBC and high speed connections via local cable connections.*
- *Get the bandwidth you expect when you need it from the ICN's meshed state network, backed by over 3.8 Gigabits per second of commercial Internet access from multiple service providers.*
- *Make your own H.323 video connections for a modest monthly cost through the ICN's IP Video service. Ensure smooth traffic flow for video and other critical applications with low cost Quality of Service (QoS).*

- *Stay in touch with your child's teacher and school, with the School to Home Communications Toolkit for K-12.*
- *Have a voice in your connection! The ICN is member driven and receives feedback through the Policy Committee, Advanced Engineering Taskforce and regional meetings.*
- *T-1, cable, fiber? Choose from a variety of connection options that best meet your site's needs.*
- *The ICN Network staff stays on top of emerging technologies and is constantly on the lookout for future trends.*
- *Go global with access to education networks worldwide through the ICN's connection to Starlight.*

The Illinois Century Network provides these benefits to over 7,000 organizations in Illinois. The people of Illinois may or may not realize the value/benefits of the ICN and the services the state provides. The quality of the network continues to improve and the benefits continue to grow. This is not an end but a beginning of increased usage of the network with information on the Internet continuing to double every year.

Challenges

The future continues to present major challenges for the ICN to provide services required to support a mission critical environment. They include:

- *maintaining a reliable and upgraded network*
- *meet the expanding needs of the user communities*
- *continue using a constituent driven model and plan for the future*
- *maintain an appropriate funding model*

Most organizations connected to the ICN depend on the network to deliver essential services. Many educational institutions have online colleges that deliver course material 24 hours per day, seven days per week. Access to the Internet is mission critical for most educational institutions. They depend on access for marketing, communications, and the delivery of services to their customers. In order to maintain quality services, the existing infrastructures need to be replaced and upgraded on a regular basis. *The challenge to the ICN is to continue maintaining a reliable and upgraded network.*

Most organizations' utilization of the ICN will continue to grow. The Internet will continue to be used to deliver more and more services. Organizations will need to expand their Internet connectivity to deliver more enriched content. There are an increasing number of applications which use video and voice that will expand the demand for Internet usage. Content providers will continue to increase the traffic of the network. *The challenge to the ICN will be to meet the expanding needs of the user communities.*

It is important to understand the user perspective when managing a large organization. Over the years, the ICN has been very effective in utilizing constituent based input in developing plans and services. The user groups assist in setting future directions for services and support by communicating their issues and concerns. Planning has become a critical component of success. Without planning, organizations are reactive not proactive. *The challenge to the ICN is to continue using a constituent driven model and plan for the future.*

Every state is facing critical fiscal issues that impact technology deployment, education, and other state services. Illinois is no exception and the single biggest threat facing the ICN is the impact that reduced and redirected funding could have on the network and the services provided to constituents. All of the issues identified as threats by the AET are related to funding, either in the form of reduced funding or the inability to bring pressure to bear on the vendors to keep costs down. If costs are not low enough, key constituents with significant purchasing power may leave the ICN, resulting in higher costs for the remaining ICN constituents. The funding model for the ICN state wide network and services must be competitive and continue to add value to the member organizations. *The challenge to the ICN is to maintain an appropriate funding model.*

We have included the recommendations for FY06 that we believe will address the challenges faced by the ICN over the next several years. I would like to thank all the members of the task force for this past year's contributions of their time and energy.

-- Gary E. Wenger
Vice President, Information Technology
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Membership

Chair

Gary E. Wenger, Vice President of Information Technology, College of DuPage

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Recommendations

1. Vision, Mission and Strategic Planning

The technology issues facing organizations are not unique to higher education, K-12, hospitals, local, county, state government, or large and small business organizations. The problem stems from a simple fact - technology has become an essential element in the way people work and communicate. For organizations to remain competitive and provide quality programs, old technologies must be replaced, existing and emerging technologies must have on-going support, and investments must be made in solutions for tomorrow. Understanding and planning for the future direction in the use of technology is critical to the success of an organization.

Planning should be an essential activity of every organization and a core element of strategic and operational processes. Planning is a future-oriented process that enables an organization to anticipate changes in internal and external environments and position itself to respond to changes as they occur. It should be a process that every organization follows. It is a dynamic and reflective process that ensures that goals are clarified, priorities are established, stakeholders are organized, and an evaluation system is implemented before critical decisions are made.

In 1999 the original legislation declared “the ICN would be a high speed telecommunications network that provides reliable communication links to and among Illinois schools, institutions of higher education, libraries, museums, research institutions, State agencies, units of local government, and other local entities that provide services to Illinois citizens. The Illinois Century Network shall build on existing investments in networking schools, colleges, and universities, avoid duplication of future efforts, maintain sufficient capacity to meet the requirements of the participating institutions, and stay current with rapid developments in technology. The Illinois Century Network shall be capable of delivering state-of-the-art access to education, training, and electronic information and shall provide access to networking technologies for institutions located in even the most remote areas of this State.”

A question to ask is: has the vision been accomplished? If so, what should the new vision be for the ICN? What is the mission of the ICN? The vision and the mission of the organization need to be reviewed and updated accordingly. A vision is a statement of “*where we are going*” and the mission is a statement of “*what we do*”.

The ICN should develop a formal strategic planning process to determine its goals and objectives based on the vision and mission. A goal is a broad statement of outcomes that an organization hopes to achieve. An objective is a measurable statement defining what is accomplished. The strategic plan for the organizational unit usually provides a three to five year forecast of the opportunities, needs, and budget required to accomplish the objectives. The plan is reviewed and updated annually allowing for changes in both needs and budget.

Recommendation: The AET recommends the ICN review the vision, mission and then develop a formal strategic plan to define goals, objectives, and measurements of the organization’s effectiveness.

2. Equipment Replacement Strategy

The network core, distribution, and switching equipment and constituent based network equipment needs to be replaced on a cycle that protects the network performance from ineffective and damaging operations. Network equipment replacement is required when advanced features are needed; backbone bandwidth is expanded; and manufacturer end of life and end of support notices are received from the vendors. The ICN has replaced the network core as needed but will need to continue to address obsolescence in the future.

Most network equipment needs to be replaced on a three-five year cycle depending on the environment. Obsolescence must be planned and funded to guarantee a cost-effective and reliable network.

The need for an equipment replacement strategy extends to the constituents as well. With the ICN reaching its fifth year of operations, many constituents are still using their original hardware. As the equipment ages, the number of hardware related incidents can be expected to increase resulting in a greater drain of ICN technical resources and impacting service to the constituents. Many constituents rely on the ICN to provide guidance and recommendations on equipment purchases.

Recommendation: The AET recommends the development of a technology replacement strategy for the ICN and constituents to improve overall network performance.

3. Network Security

Network security continues to be a critical issue facing those involved in the support of information technology systems. The list of issues includes: e-mail – spam, open relay; host – virus / worms; and service impacting – DOS attack, hackers. For the most part, these concerns can be mitigated with the use of a firewall and patched systems with up to date antivirus software installed. The ICN security team has completed much work this past year on the “Best Practices” section of the ICN website (www.illinois.net/support) to provide constituents with helpful hints and a master contract on Antivirus solutions for staying on top of and preventing security breaches.

The ICN technical staff continues to look at additional services in the security arena. Potential ICN service offerings could include:

- Intrusion Prevention Solutions – reduces unwanted traffic and provides bandwidth shaping on the network
- Patch Management – testing and distribution of software updates
- Firewall service – exclusively limits access to a local area network
- Custom router configurations – access lists to deter hackers
- Consulting service – securing the windows environment
- E-mail services – anti-spam software to minimize unwanted e-mail

Recommendation: The AET supports the exploration and implementation of expanded cost effective services that would benefit the ICN constituents and the network operation.

4. Content Providers

The ICN staff continues to look for ways to make content more accessible to constituents. Currently the emphasis is on the sharing of educational content, such as those resources provided by the state library and the museums. Collocation of content servers on the network is one of the means to facilitate access to content, yet the constituent survey indicated little interest in this potential service at this time. Increased bandwidth, at low or no cost, e.g. bandwidth “grants,” to content providers is an avenue that should be investigated in the ongoing effort to encourage the sharing of content via the network. As the number and types of constituents continues to grow, additional opportunities for sharing content will emerge. The healthcare community has already identified several areas in which they could benefit by sharing content and in all likelihood state agencies will do the same.

Recommendation: The AET suggests that the ICN staff continue to pursue collocation, developing a service that can be marketed to constituents.

5. Cost Recovery Model

The current cost recovery model provides an effective solution for the ICN to recover most of the costs during the fiscal year. The model provides a fair and equitable solution in providing rates for all constituents. The educational constituents receive a base line of service based on the full-time equivalent (FTE) enrollment and pay for services above that level. All other constituent rates are set based on ICN costs. The FTE model for primary constituents works reasonably well and the implementation this year of a new process encourages community sharing of bandwidth.

Delivering services to the digital divide areas in the state creates its own financial challenges in providing cost effective services. The ICN needs to consider any increases in the cost recovery model very carefully. To cost justify the ICN service, the cost has to be at or below market rates. The ICN needs to continue to define its value added service. Any erosion of service level, reliability, or cost increase without increased service value will drive constituents away. The ICN needs to continue to hold or reduce the cost of service to all constituents.

Recommendation: The AET recommends that the ICN continue to provide high quality service and support while maintaining the existing cost recovery model.

6. Wireless Technologies

The ICN continues to investigate the role that wireless technologies will play in providing lower cost, last mile connectivity to constituents who have limited access to such services.

Organizations throughout the country are increasingly embracing wireless technologies to provide increased mobility for users. The rapid proliferation of wireless local-area networks is having a dramatic impact on network availability. A new technology called WiMax promises to do for the metropolitan-area network what WiFi has done for the local-area network. New wireless broadband offerings such as EDGE and EVDO from the cell provider will continue to grow.

Many of these new technologies have the potential to provide constituents with a low cost fixed solution for connecting constituents within a community as well as last mile connectivity to the

ICN. This strategy may provide additional solutions to address the digital divide issues within the state.

Recommendation: The AET recommends continued investigation of wireless technologies to add value and reduce cost over landline solutions for all constituents.

7. State Wide Contracts

In the past the state has provided state contracts on equipment and software that could benefit all the constituents. It has been very difficult finding out what is on state contract and understanding how to use the contract pricing. The issue can be resolved with better access to master contracts and the posting of buying opportunities to save money for all ICN constituents.

Recommendation: The AET recommends that the State develop a system providing easier access to the state wide contracts for technology as well as products and services.

8. Converged Networks – Voice, Video and Data

The ICN network allows for the transport of digital data. The convergence of voice, video, and data will continue at all our organizations. We are seeing a large number of ICN constituents who have moved, or who are in the process of moving, or who are in the planning stages of creating a converged network within their organizations. Many constituents are already using Voice over IP to transmit their voice calls and H.323 for two-way interactive video across the network. Today, and in the future, more and more voice, video, and data transmission will utilize the network. The technology will continue to change and new standards will evolve. There are benefits available for all state organizations that must be explored to see if these current and new technologies will work in their environment.

Recommendation: The AET recommends the ICN continue to investigate these new technologies such as VOIP and determine appropriate models that can benefit the ICN constituents.