Network Nebraska

Objective

The primary objective of this initiative is to develop a broadband, scalable telecommunications infrastructure that optimizes the quality of service to every public entity in the State of Nebraska. Network Nebraska aggregates disparate networks into a multipurpose core backbone extending from Norfolk, Omaha, Lincoln, Grand Island, Kearney, and North Platte to the Panhandle. The State of Nebraska, Division of Communications, the University of Nebraska, Nebraska Educational Telecommunications Commission, Department of Education, Public Service Commission, and the Nebraska Information Technology Commission have formed the Collaborative Aggregation Partnership (CAP) to guide and implement Network Nebraska. The next phase of this initiative is to formalize business relationships and agreements and to enhance rural bandwidth through local aggregation.

Through aggregation of demand, adoption of common standards, and collaboration with network services and applications, Network Nebraska participants can achieve many benefits.

Description

The major components of this initiative include:

- Development of a scalable, reliable, and secure telecommunications infrastructure that enables any type of eligible entity (i.e., local and state government, K-12 and higher education, health care institutions) to purchase the amount of service that the entities need, when they need it, on an annual basis;
- Establishment of a catalog of value-added applications that enables eligible entities to pick and choose services that are pertinent to them (e.g., Internet1, Internet2, and videoconferencing);
- Implementation of a network operations center that offers a helpdesk, network diagnostics, and engineering assistance in order to ensure acceptable qualities of service;
- Establishment of a billing or accounting center to accept service orders, extend service agreements, provide consolidated billing, and to maintain customer accounts.

Benefits

Through aggregation of demand, adoption of common standards, and collaboration with network services and applications, participants can achieve many benefits, including:

- Lower network costs;
- Greater efficiency for participating entities;
- Interoperability of systems providing video courses and conferencing;

- Increased collaboration among all K-20 educational entities;
- New educational opportunities;
- Competitiveness with surrounding states; and
- Better use of public investments.

Action Plan

Current Action Items

1. Identify Tier II communities that offer opportunities for aggregation for services onto the network.

Action: The CAP will identify and work with communities that express an interest in aggregating their public sector transport.

Lead: Network Nebraska (CAP)

Participating Entities: Specific communities, NITC Community Council, Nebraska League of Municipalities, Nebraska Association of County Officials, public libraries, NITC Education Council

Timeframe: February 2006-December 2006

Funding: No funding required for this action item.

Status: New

Action: The CAP will write and release a brief that explains the technical feasibility of sharing public sector transport over high bandwidth, IP-based circuits in order to incentivize Tier II aggregation.

Lead: Network Nebraska (CAP)

Participating Entities: NITC Education Council, NITC Community Council, ESU-NOC, Nebraska League of Municipalities, Nebraska Association of County Officials, public libraries

Timeframe: February 2006-December 2006

Funding: No funding required for this action item.

Status: New

2. The Chief Information Officer will arrange for all eligible network participants to have the opportunity to access Network Nebraska at the earliest available opportunity.

Action: The Chief Information Officer will establish criteria for "access to" Network Nebraska in order to satisfy the requirements of LB 1208.

Lead: Chief Information Officer

Participating Entities: Network Nebraska (CAP)

Timeframe: February 2006

Funding: No funding required for this action item.

Status: New

Action: The Chief Information Officer will determine the specifications of any regional aggregation centers that must be established in order to serve the statewide data traffic of K-12 and postsecondary education institutions.

Lead: Chief Information Officer

Participating Entities: Network Nebraska (CAP)

Timeframe: February 2006-April 2006

Funding: No funding required for this action item.

Status: New

3. Offer Internet I services to eligible network participants.

Action: The CAP will accept new orders for Internet service and continue to aggregate purchasing demand to secure a more economical price for statewide Internet service.

Lead: Network Nebraska (CAP)

Participating Entities: NITC Education Council, NITC Community Council

Timeframe: February 2006-December 2006

Funding: No funding required for this action item.

Status: Continuation

Network Nebraska

4. Meet with the Technical Subcommittee of the Nebraska Statewide Telehealth Network to discuss issues related to network administration, scheduling and management.

Action: The Collaborative Aggregation Partnership will conduct ongoing discussions with the Technical Committee of the Nebraska Statewide Telehealth Network.

Lead: Network Nebraska (CAP)

Participating Entities: Nebraska Telehealth Network Technical Subcommittee, NITC Technical Panel

Timeframe: February 2006-December 2006

Funding: No funding required for this action item.

Status: Continuation

5. Implement a cost and funding model to allow shared use of the statewide backbone for data transport.

Action: Develop an equitable cost and funding model that takes into account the number of participating entities, student populations, and the cost for transport and ongoing aggregation services.

Lead: Network Nebraska (CAP)

Participating Entities: Network customers

Timeframe: March 2006-June 2006

Funding: Funding determined by LB 1208

Status: New

Network Nebraska

6. Convene a work group to use high bandwidth flexible use circuits as community aggregation points and create a statewide, high bandwidth digital content delivery system using satellite, terrestrial and wireless technology.

Lead: Office of the NITC

Participating Entities: Technical Panel, Community Council, Education Council, State Government Council

Timeframe: March 2006-June 2006

Funding: No funding is required for this collaborative action item.

Status: New

Future Action Items

1. Develop a three-phase (2007-09) upgrade plan for statewide backbone transport that includes the demand created by the upgrade of K-12 districts and colleges converting to IP networking.

2. Investigate the feasibility of offering advanced network services to Network Nebraska customers.

Completed Action Items (2004-2005)

1. Created a Service Level Agreement for use by CAP and the eligible network participants.

2. Created a Network Nebraska Level 1 Helpdesk at 888-NET-NEBR (888-638-6327).

3. Created a Network Nebraska Web site (www.networknebraska.net).

Wayne's last mile aggregation provides better services at lower costs

By Dennis Linster, Wayne State College

In November 2002, Wayne City Administrator Lowell Johnson and Wayne State College CIO Dennis Linster presented a proposal to the NITC Technical Panel for approval of a plan to aggregate all of the tax-supported IP-based telecommunication services in Wayne, Nebraska and centrally distribute those services to the tax-supported entities. The initial plan included hosting the telecommunications services for Wayne city offices and NorthStar Regional Services at Wayne State College through a wireless connection. The NITC Technical Panel endorsed the plan as feasible and a promising example of Tier II aggregations among municipalities. The project was named the "Last Mile Project" by their technical team.

Wireless antenna and tower arrays connect Wayne municipal public entities with the Wayne State College campus. Photos courtesy of Wayne State College

Wayne State College had several characteristics that made it a logical service consolidator. The President of the college lent support for this undertaking. The college had a network operating center that was open 24 x 7 and a very high-quality staff to ensure the success of the project. And, the City of Wayne was eager to make this project happen. The technical team chose a wireless transport solution to facilitate a connection between campus and the main city office building. Wireless technology was also used to connect the seven remaining city buildings to the main city office. The city and college technical staffs worked in partnership to make these connections functional.

In February 2003 the connection was completed, and it has been working flawlessly since. After more than two years of rain, sleet, snow, high winds, fog, virus outbreaks, and even power outages, the wireless connection performed very reliably. In 2004, NorthStar Regional Services and Wayne Public Schools were also connected by wireless. NorthStar Regional Services provides community-based services to people with developmental disabilities.

"This is nothing short of a win-win scenario in which the taxpayers are the real winners. Better services, lower costs."

—Dennis Linster

Network Nebraska

As a Tier II aggregation site, Wayne State College has been able to aggregate public entities' municipal Internet demand with their own and then contract with Network Nebraska for Internet service. The combination has not only improved the quality of service for the involved partners but also lowered costs.

Linster comments about the 'Last Mile Project', "It is evident that the collaboration of support is something that was seriously needed in our community, and likely is needed in other communities as well. Along with the collaboration of support, we have aggregated the services and expanded the opportunities of all partners technically. This is nothing short of a win-win scenario in which the taxpayers are the real winners. Better services, lower costs."

Project 42 joins Network Nebraska, gains bandwidth and reduces costs

By Alan Wibbels, ESU 10

Project 42—a consortium formed by ESUs 10, 11, 15, and 16—serves 163 school districts in 33 counties and covers approximately 32,000 square miles. Over 10,000 faculty and staff have e-mail accounts provided by the consortium and 50,000 students currently use the network to access the Internet and web-based services available both at the ESUs and around the world.

Then Lt. Governor Dave Heineman, UNL Assistant Vice Chancellor Kent Hendrickson, UNK Chancellor Doug Kristensen, and ESU 10 Systems Engineer Ron Cone "turned on" access to Internet 2 by Nebraska schools. July 2004 photo courtesy of ESU 10

Prior to joining *Network Nebraska*, Project 42's Internet access costs were approximately $500 per megabit of bandwidth per month ($10,000 per month for 20 megabit) before the e-rate discount. By moving to the state network, the

Network Nebraska

cost per megabit has dropped to $150 per megabit per month and Project 42 has been able to expand the bandwidth to 30 megabit. As a result, Project 42 is able to deliver greater bandwidth and experience a savings of $5,500 per month!

Project 42 anticipates continued reduction in costs as more customers join *Network Nebraska*. Obviously the cost for transport across the state will not be free. However, as more customers share the cost of the transport and the state uses its aggregated purchasing power to buy greater amounts of Internet access, all participants should realize reduced costs per megabit of bandwidth.

In addition to basic Internet services, *Network Nebraska* provides K-12 schools with the opportunity to participate in Internet 2 services and activities as outlined on the Internet 2 (I2) initiative web site (http://k20.internet2.edu/about/goals.html). Project 42 has used the high-speed I2 access to download large data files and to create interactive connections with students across the United States. Examples of interactive projects include:

- Sixth graders from Bertrand connected with a senior high class in Texas for a lesson on cotton and its many uses.
- Second grade students from Pleasanton connected with second graders in two communities in Texas and New York to share information about their hometowns and cultural differences.
- Several schools in Project 42 interacted with Mr. Cox, a World War II veteran in Texas, who had survived the sinking of the USS Indianapolis by the Japanese in the South Pacific. Students had the opportunity to hear the story first hand and to interact with him.
- A number of connections have been established with the Lewis and Clark Expedition project for the purpose of training teachers how to use Internet2.

By moving to the state network, Project 42's cost per megabit has dropped to $150 per megabit per month.

Statewide Synchronous Video Network

Numerous schools have taken part in similar NASA programs, live discussions with Nebraska native Astronaut Clayton Anderson, and also the Edgerton Explorit Center's own unique programming.

Edgerton Explorit Center connects to NASA

In December of 2003, the Edgerton Explorit Center (EEC) in Aurora launched its Distance Learning Program by connecting students at the EEC with educators from NASA's Johnson Space Center. Since this time, numerous schools have taken part in similar NASA programs, live discussions with Nebraska native Astronaut Clayton Anderson and also the EEC's own unique programming, which includes "Seeing Through the Eyes of Discovery", "Virtual Dissection" and "Supercold Chemistry". Programs are specifically designed to meet the needs of educators and the Nebraska Department of Education Science Standards.

Members of the first Edgerton Elite Science Camp videoconference with NASA astronaut and Nebraska native Clayton Anderson from the Edgerton Explorit Center's distance learning room. Photo courtesy of Edgerton Explorit Center

The EEC Distance Learning Room has the capabilities to connect with almost every school in the state via a direct scheduled connection, through the internet by dialing an IP address or via a transferred satellite connection. School groups, summer camps, scout excursions, business meetings, and educational planning sessions have been conducted with groups from across the state and beyond. The classroom is equipped with a digital microscope camera, document camera, electronic white board, retractable ceiling video screens, and work desks/chairs with microphones.

In January of 2005, the EEC added experiences that were truly interactive. Students who log onto the EEC website during a distance learning event are able to control demonstration equipment from their classroom. This follows directly from Doc Edgerton's philosophy that we all learn best by getting our hands on things.

Statewide Synchronous Video Network

Objective

The primary objective of this initiative is to establish an Internet Protocol-based network that will interconnect all existing and future distance learning and videoconferencing facilities in the State of Nebraska. Nebraska currently has approximately 300 high school distance learning classrooms, 30 higher education distance learning classrooms, over 50 state agency videoconferencing rooms, and (soon-to-be) over 60 videoconferencing facilities for telehealth in local and regional hospitals. More growth and proliferation of distance learning and videoconferencing equipment and sites is expected in the near future. These 400+ interactive video facilities currently utilize a variety of video standards and bandwidth speeds that prevent interconnection between sub-networks. The Statewide Synchronous Video Network, as envisioned, would use compatible audio and video standards to enable any classroom or facility to connect with any other classroom or facility or to connect with multiple sites simultaneously.

The Statewide Synchronous Video Network would use compatible audio and video standards to enable any classroom or facility to connect with any other classroom or facility or to connect with multiple sites.

Description

The major components of this initiative include:

- A single, interconnected synchronous video network with various levels of authorization and traffic prioritization;
- An event clearinghouse and scheduling system that would allow registration for interactive video events;
- Development of a network bandwidth management system or network operations center that assures pre-determined qualities of service, depending upon the type of video traffic.

Benefits

Interactive videoconferencing and distance learning developed rapidly across Nebraska in the 1990's. Prior to recognized video standards or a coordinating body, entities were free to adopt any equipment, standard, or system that met their needs. Little thought was paid to interconnectivity or compatibility. Consequently, Nebraska became a state of disparate, redundant systems that prevented multi-jurisdictional collaboration or maximization of educational opportunities outside of a particular geographic boundary or system.

The enterprise benefits of an interconnected video system include:

- Greater sharing of educational courses, events, and training across sub-network boundaries, irrespective of geography;

Statewide Synchronous Video Network

- More efficient use of available resources—more classrooms and sites are available within less distance of the user at more convenient times;
- One-to-many videoconferencing capabilities for news alerts, bioterrorism alerts, or other emergency uses;
- Collaborative development across various service agencies (i.e., medical services to schools, and adult and continuing education opportunities).

Action Plan

Current Action Items

1. Acquisition of upgrade or replacement equipment and/or software that ensures compliance with the audio and video standard.

Action: The Chief Information Officer will determine the list of biddable hardware and software items related to distance education for purposes of enhancing distance education according to LB 1208.

Lead: Chief Information Officer

Participating Entities: NITC Technical Panel, DAS-DOC, ESU-NOC

Timeframe: March 2006-April 2006

Funding: No funding required for this action item

Status: New

Action: The Chief Information Officer will bid for equipment (hardware and software) related to distance education, which meets at least minimum standards as set by the Nebraska Information Technology Commission for all eligible network participants who want to participate in statewide leasing and/or purchasing contracts.

Lead: Chief Information Officer

Participating Entities: DAS-DOC, DAS Purchasing

Timeframe: March 2006-May 2006

Funding: Determined by the Legislature through LB 1208

Status: New

Action: The Chief Information Officer will designate a fiscal entity or entities to oversee ordering, delivery and installation of distance learning equipment.

Lead: Chief Information Officer

Participating Entities: To be named.

Timeframe: March 2006-August 2006

Funding: Determined by the Legislature through LB 1208

Status: Continuation

2. Development or purchase of a scheduling system or enterprise resource management program that allows potential users to know the location and availability of resources, and/or set up or reserve ad hoc or regularly scheduled events with other entities.

Action: Research scheduling systems and enterprise resource management programs.

Lead: NITC Technical Panel's Statewide Synchronous Video Work Group

Participating Entities: NET, NDE, NITC staff

Timeframe: February 2006

Funding: No funding required for this task.

Status: Continuation

Action: The Nebraska Information Technology Commission shall establish standards or bid specifications related to synchronous video scheduling software or scheduling services.

Lead: NITC Technical Panel

Participating Entities: NITC Technical Panel's Statewide Synchronous Video Work Group

Timeframe: February 2006-April 2006

Funding: No funding required for this task.

Status: New

Action: Purchase or develop a scheduling system and/or enterprise resource management program.

Lead: Distance Education Council for K-12; each agency for their respective purchases.

Participating Entities: Network Nebraska (CAP)

Timeframe: Summer, 2006

Funding: To be determined by LB 1208.

Status: Continuation

3. Implement a network bandwidth management system or network operations center that assures pre-determined qualities of service, depending upon the type of data traffic.

Action: Implement a network operations center that assures particular qualities of service.

Lead: Network Nebraska (CAP)

Participating Entities: Network Nebraska customers

Timeframe: April 2006 –July 2006

Funding: To be determined.

Status: Continuation

4. Develop an event clearinghouse that allows promotion, marketing, and registration for interactive video events.

Action: Develop a web-based clearinghouse that allows originators to post events and users to register for or view the date, time and frequency of individual events.

Lead: ESU Distance Education Council

Participating Entities: NITC Technical Panel's Statewide Synchronous Video Network Work Group, NITC Education Council

Timeframe: April – July, 2006

Funding: To be determined by LB 1208.

Status: Continuation

Statewide Synchronous Video Network

5. Develop a cost and funding algorithm to allow shared use of the statewide backbone for interstate distance learning and videoconferencing.

Action: Research models from other States' education networks.

Lead: Network Nebraska (CAP)

Participating Entities: NITC Technical Panel's Statewide Synchronous Video Work Group

Timeframe: Ongoing

Funding: No funding required for this task.

Status: Continuation

6. Examine policy implications of the use of shared network assets.

Action: Convene a workgroup to examine policy implications of the use of shared network assets.

Lead: Office of the NITC

Participating Entities: NITC Technical Panel, State Government Council, Education Council, Community Council

Timeframe: Ongoing

Funding: No funding is required for this collaborative action item

Status: New

Future Action Items

1. Develop a three-phase (2007-09) equipment and transport upgrade plan for synchronous video distance learning that affects a majority of the network users.

Completed Action Items

1. Identified a single audio and video standard for low-bandwidth distance learning and videoconferencing.

Security and Business Resumption 2007

Objective

- This initiative will define and clarify policies, standards and guidelines, and responsibilities related to the security of the state's information technology resources.

Description

Information security will serve statutory goals pertaining to government operations and public records. These include:

- Insure continuity of government operations (Article III, Section 29 of the Nebraska Constitution; Nebraska Revised Statutes Sections 28-901 and 84-1201);
- Protect safety and integrity of public records (Nebraska Revised Sections 28-911, 29-2391, and 84-1201);
- Prevent unauthorized access to public records (Nebraska Revised Statutes Sections 29-319, 81-1117.02, and 84-712.02);
- Insure proper use of communications facilities (Nebraska Revised Statutes Section 81-1117.02); and
- Protect privacy of citizens (Nebraska Revised Statutes Section 84, Article 7).

Major activities include:

- Developing an overall security strategy, including policies, security awareness, and security infrastructure improvements;
- Network security standards and guidelines;
- Education and training;
- Authentication (directory services project);
- Disaster recovery for information technology systems (as part of a broader business continuity planning);

- Compliance with federal privacy and security mandates;
- Security assessments.

Benefits

Benefits will include lower costs by addressing security from an enterprise perspective, cost avoidance, and protecting the public trust.

Action Plan

Current Action Items

Security

1. Conduct annual independent security audits. Multiple federal programs require periodic computer security audits, including HIPAA, HAVA, and Bioterrorism grants from the Center for Disease Control. Computer security audits are a widely accepted best practice across the public and private sector.

Lead: State Security Officer

Participating Entities: State Government Council, Security Work Group

Timeframe: Investigate opportunities for aggregating efforts of several state agencies that face federal requirements for security audits – Ongoing.

Funding: To be determined.

Status: Ongoing

2. Implement security incident response team.

Lead: State Security Officer and State Patrol

Participating Entities: State Government Council, Security Work Group

Timeframe: December 2007

Funding: No funding required for this task.

Status: New

3. Enhance Network Security and Network Management.

Action: Investigate and recommend an enterprise solution to ensure that encrypted traffic adheres to State security requirements.

Lead: Office of the CIO - Network Support

Participating Entities: State Government Council

Timeframe: June 2007

Funding: No funding required for this task.

Status: Continuation

Action: Evaluate and recommend options for providing encryption to clients across the state's Wide Area Network.

Lead: Office of the CIO - Wide Area Network

Participating Entities: State Government Council

Timeframe: December 2007

Funding: No funding required for this task.

Status: Continuation

Business Resumption

4. Implement shared disaster recovery facilities. Mission critical systems have three common requirements. Recovery times must be measured in hours, not days or weeks. Recovery facilities should be physically separated so that they will not be affected by a single disaster. There must be staff available to assist with the recovery efforts. Achieving these requirements is very expensive. Sharing disaster recovery facilities and establishing a collaborative approach to disaster recovery is one strategy for managing costs. The Office of the CIO and the University of Nebraska are jointly developing a fast recovery capability using mutual assistance of physically separated data centers.

Lead: Office of the CIO and University of Nebraska

Participating Entities: State Government Council

Timeframe: Ongoing

Funding: The cost and source of funding have not been determined.

Status: Continuation. Several hardware components have been co-located at current alternate sites. Data recovery time has been significantly reduced. Planning for a shared alternate site providing greater geographic separation has begun. Efforts to identify additional opportunities for collaboration continue.

5. Promote disaster planning for information technology systems, including developing elements of a common planning document and develop an approach for implementation of ICS (Incident Command System).

Lead: Steve Henderson / Dave Berkland

Participating Entities: State Government Council

Timeframe: Ongoing

Funding: No funding required.

Status: Continuation. Director-level meetings, chaired by Lieutenant Governor Sheehy, to discuss restoration of services began in November 2005. Critical business functions for agencies have been identified and prioritized. IT components supporting the critical business functions have been identified. ICS implementation is being more closely coordinated with the Nebraska Emergency Management Agency. Work to explore the possibilities of integrating continuity of operations plans with disaster recovery plans continues.

6. Encourage testing and updating of disaster plans.

Lead: Steve Henderson / Dave Berkland

Participating Entities: State Government Council

Timeframe: Ongoing

Funding: No funding required.

Status: Continuation. The Continuity of Operations Planning/Disaster Recovery Planning Shared Services Group continues to develop and act on ways to better coordinate disaster recovery planning and to provide for more consistent disaster

recovery plans. An NITC standard ("Agency Disaster Recovery Plan - Standard Contents Recommended Practices") has been put in place. Work has been completed to better understand disaster recovery plan assumptions and dependencies.

Future Action Items

1. Convene a work group to improve disaster recovery and business continuity procedures, including homeland security preparedness, for all public entities.

Completed Action Items (2005-2006)

1. Network Security and Network Management: Configured all public IP addresses (164.119) behind the state's firewall complex.

2. Network Security and Network Management: Implemented an intrusion detection and prevention system on the state's Internet connection as part of a layered defense.

3. Disaster Planning: Conducted an "executive overview" briefing to state agencies explaining the progress and current and future activities in the development of disaster recovery plans.

4. Security incident reporting process developed.