

Nebraska Information Technology Commission

Project Proposal Form

**New or Additional State Funding Requests
for Information Technology Projects**

FY2005-07 Biennium

Project Title	Distance Learning—Infrastructure, Programming, and Training
Agency/Entity	Department of Education

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About this form...

The Nebraska Information Technology Commission (“NITC”) is required by statute to “make recommendations on technology investments to the Governor and the Legislature, including a prioritized list of projects, reviewed by the technical panel, for which new or additional funding is requested.” In order to perform this review, the NITC and DAS-Budget Division require agencies/entities to complete this form when requesting new or additional funding for technology projects. For more information, see the document entitled “Guidance on Information Technology Related Budget Requests” available at <http://www.nitc.state.ne.us/forms/>.

Electronic versions of this form are available at <http://www.nitc.state.ne.us/forms/>.

For questions or comments about this form, contact the Office of the CIO/NITC at:

Mail: Office of the CIO/NITC
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Lincoln, NE 68508
Phone: (402) 471-3560
Fax: (402) 471-4608
E-mail: info@cio.state.ne.us

Submission of Form

Completed forms must be submitted by the same date biennial budget requests are required to be submitted to the DAS Budget Division. Completed project proposal forms must be submitted via e-mail to info@cio.state.ne.us. The project proposal form should be submitted as an attachment in one of these formats: Microsoft Word; WordPerfect; Adobe PDF; or Rich Text Format. Receipt of the form by the Office of the CIO will be confirmed by e-mail. If an agency is unable to submit the application as described, contact the Office of the CIO prior to the deadline, to make other arrangements for submitting a project proposal form.

Section I: General Information

Project Title	Distance Learning—Infrastructure, Programming, and Training
Agency (or entity)	Nebraska Department of Education

Contact Information for this Project:

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Section II: Executive Summary

The Distance Learning—Infrastructure, Programming and Training Project intends to capitalize on the three strategic initiatives of the NITC in order to improve the access, content and training opportunities of distance learning to address the essential education expectations for all Nebraska schools. These initiatives include:

- **Network Nebraska.** The primary objective of Network Nebraska is to develop a broadband, scalable telecommunications infrastructure that optimizes the quality of service to every public entity in the State of Nebraska. Potential benefits of Network Nebraska include lower network costs, greater efficiency, interoperability of systems providing video courses and conferencing, increased collaboration among educational entities, and better use of public investments. Specific technologies required: Network routers that can ensure differentiated qualities of service for various data applications.
- **Statewide Synchronous Video Network.** This initiative will establish an Internet Protocol-based, high bandwidth network that will interconnect all existing and future distance learning and videoconferencing facilities in the state. Benefits include greater sharing of educational courses and resources; more efficient use of available resources; and one-to-many videoconferencing capabilities for alerts and emergency situations. Specific technologies required: School site routers, Aggregation point routers, School site Codecs (Coder-Decoders), School LAN upgrades, Distance learning scheduling/management system.
- **Nebraska eLearning Initiative.** This initiative will promote the effective and efficient integration of technology into the instructional process and will utilize server-based course management software to deliver enhanced educational opportunities through web-based instruction. A standards-based eKnowledge repository will provide students and teachers equitable access to rich instructional resources. Specific technologies required: Primary and Secondary course management software servers, Digital content library, School site content servers, eKnowledge repository server.

Section III: Goals, Objectives, and Projected Outcomes (15 Points)

1. Describe the project, including:
 - Specific goals and objectives;
 - Expected beneficiaries of the project; and
 - Expected outcomes.

Goals

The overall goal of the Distance Learning—Infrastructure, Programming and Training Project is to use technology to create equitable opportunities for an essential education for all students. The technology elements would concentrate on providing the necessary curriculum, staffing, and support services essential for all Nebraska schools.

The resulting K-12 technologies would support teaching and learning through hardware and software that: Transmit and access information and data, Integrate digital technologies into the teaching and learning process, Provide access to multiple technology platforms; and have physical facilities that adequately accommodate the school's technology systems, including distance learning.

The first objective of the project is to provide infrastructure and telecommunications support so that schools can purchase Internet access on an equitable per unit basis without regard to distance-sensitive transport costs.

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The second objective of the project is to assist in the conversion of the present distance learning network to a high bandwidth, wide area, IP-based topology that allows educators to make maximum use of the flexibly provisioned circuits in order to provide for future emerging technology applications. The interactive video conferencing that results from this conversion would be much lower in bandwidth, addressable, and able to be interconnected with other systems both within and outside the State.

The third objective of this project is to create an eLearning system that allows every student access to equitable learning opportunities to achieve an essential education. This objective includes implementation of course management software and access to a digital knowledge repository from every school in the State. This system allows an agency to target particularly acute teacher shortage areas with additional staff working on a statewide basis. It also can make available Advanced Placement Courses to anywhere in the State.

Beneficiaries

The expected beneficiaries of this project are the students, teachers and citizens of Nebraska. By enhancing our telecommunications potential, the state public school system and resulting educational opportunities will be an attractive economic development tool for Nebraska. More students will graduate, more prepared for the world of work or a postsecondary education. Smaller rural schools will remain viable, thereby enhancing the quality of life and opportunities for agriculture and small business for greater Nebraska.

The benefits of a statewide eLearning system would include:

- The sharing of learning objects and other educational content and reference materials that would significantly enrich and deepen the learning experiences offered to Nebraska students, particularly those in the K-12 sector;
- The ability to address the educational requirements of students with “high challenge” needs such as students from low-income families, students who change schools frequently, and those learning English for the first time in school;
- The development and delivery of specific high need coursework on a statewide basis; world languages, advanced placement courses, and college/dual credit courses;
- Greater collaboration among educators at all levels;
- The building of extended learning communities and support for ongoing professional development and lifelong learning opportunities;
- Creation of a dual-use training engine for other state agencies, political subdivisions, and adult continuing education; and
- Development of diverse instructional and training modules ranging from the simple (how to operate a piece of machinery) to the complex (a web-based course to achieve technician certification).

The successful implementation of these three initiatives would literally make possible an educational environment where learning could occur at any time, at any place, through any path and at any pace. From the smallest rural school to the most challenged urban center, the technology would provide a conduit for equitable educational opportunities. Advanced placement classes, remediation for Limited English Proficiency students, college credit courses, alternative education modules for home-bound learners are all within the realm of these delivery mechanisms.

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Outcomes

- A. School districts, Educational Service Units, or data aggregation consortia will be able to purchase Internet access at the same cost per unit, with an offset for transport fees in order to insure that distance does not preclude participation.
- B. Over 160 high school distance learning circuits will be converted from commercial video data services to IP-based, high bandwidth circuits, capable of delivering a variety of technology applications.
- C. All JPEG-based distance learning classrooms would be converted to H.26X video compression protocol and capable of interconnecting with every other IP-based video facility within and outside the State.
- D. A statewide scheduling and asset management system would be created to monitor the usage of distance learning facilities and allow external users to identify open facilities and send a request to the local scheduler.
- E. A web-based event clearinghouse would be created to promote and advertise educational programming and training opportunities.
- F. The project would provide for implementation of course management software and a digital content repository for 150,000 students across the State, scalable to 300,000.
- G. A site-based server array would be implemented to allow schools to request and download large volumes of licensed digital content from the NET satellite system, 24 hours per day.

2. Describe the measurement and assessment methods that will verify that the project outcomes have been achieved.

The strategic plans for Network Nebraska, the Statewide Synchronous Video Network, and the Nebraska eLearning Initiative will provide accountability by tracking progress on each of the strategic initiatives. In addition, NDE will develop metrics and gather data to document the use and benefits of incorporating these technologies into the classroom. Ultimately, the increased number of educational opportunities and instructional resources should translate into increased student progress and achievement and more equitable learning for students all over the State. The resulting networking infrastructure should be sufficient to serve schools for the next seven years.

3. Describe the project's relationship to your agency comprehensive information technology plan.

The Distance Learning—Infrastructure, Programming, and Training Project, although not mentioned specifically in the NDE Technology Plan, does serve the purposes and eventual applications listed in the Technology Plan. The Nebraska Student Records System and Redesign of the School Personnel and Curriculum System will rely heavily on robust, high-speed infrastructure to every school. NDE's continual training requirements and travel for its many divisions will be made manageable by using the eLearning system and IP-based videoconferencing sites.

Section IV: Project Justification / Business Case (25 Points)

4. Provide the project justification in terms of tangible benefits (i.e. economic return on investment) and/or intangible benefits (e.g. additional services for customers).

Since 1992, various entities within the State of Nebraska have spent an estimated 20 million dollars on interactive video capture and display equipment, fiber connectivity, and engineering design charges to provide for distance learning and videoconferencing. Considered cutting edge technology in the early years of operation, this investment resulted in over 300 high-quality, videoconferencing

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classrooms using multiple, incompatible video protocols spread over numerous separate political subdivisions. These service regions were established when groups of school districts partnered together to set up interlocal agreements in order to receive grant funds, enter into contracts and hire staff to exchange high school and college classes. Other smaller videoconferencing networks were set up by other state agencies and hospitals but were not interoperable with the school and college sites.

The technology in many of these distance-learning networks is obsolete and no longer supported by the manufacturer. Service contracts with telecommunications providers to support the technology will expire over the next two to eight years. The estimated cost to upgrade these systems and just maintain the existing distance learning functionality is \$55 million. Without the network system upgrade, schools would be forced to revert back to pre-1996 infrastructure. The resulting bandwidth would be unable to support even the most minimal Internet access and would be unable to scale for future educational needs.

The current distance learning networks utilize telecommunications circuits with very large bandwidth (DS3 or 45megabit connections) that are dedicated almost solely to video use. Data circuits for accessing the Internet are often limited to a single T-1 (1.5megabit) circuit. The proposed IP-based upgrade plan would greatly increase the efficiency of video transmissions and free up significant capacity for other uses, such as Internet1, Internet2, video on demand, web-based courses, and data transfer. The number and type of technology applications carried by the high bandwidth circuits would be determined by the education sector rather than the provider sector. Implemented statewide, this would put Nebraska's schools in the forefront of the nation in terms of high speed access.

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 PreK-16 educational entities;
- New educational opportunities;
- Competitiveness with surrounding states; and
- Better use of public investments.

5. Describe other solutions that were evaluated, including their strengths and weaknesses, and why they were rejected. Explain the implications of doing nothing and why this option is not acceptable.

Each of the NITC Strategic Initiatives cited in this project proposal introduce technology options or educational advantages that would not be possible under the present system.

Networking

Old system: K-12 districts individually negotiate their own Internet and transport contracts. This approach was rejected for lack of efficiency and effectiveness.

Network Nebraska: K-12 districts and other public entities are able to purchase Internet and transport off the State contract, thereby reducing telecommunication costs.

Synchronous Video

Old system: 297 high schools, having spent millions of dollars for implementation and network buy-down costs, divided themselves up into 12 distance learning consortia, ranging in size from six to

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70 schools, and using up to four different video standards, and were unable to exchange courses across different technologies. This approach was rejected because it lacked interconnectivity. Statewide Synchronous Video Network: Any entity with an IP-based videoconferencing cart will be able to “dial-up” and connect to any other entity also using IP-based videoconferencing. This includes 95% of the high schools, most of the higher education entities, hospitals, and informal education entities, as well as colleges and schools on Internet2 across the United States.

Electronic Learning

Old system: Colleges and schools negotiate individual course management software contracts and develop experimental content and instructional resources without collaboration. This approach was rejected because it does not create a scalable, statewide system, capable of leveraging resources from across the state.

e-Learning Initiative: Schools, colleges, and universities collaborate and communicate about various course management software options and experiences, and organize a knowledge repository to store retrievable course content while sharing best practices, support services, and training resources.

6. If the project is the result of a state or federal mandate, please specify the mandate being addressed.

The State Board of Education passed the following resolution on December 5, 2003, calling for the establishment of requirements in order to accomplish an Essential Education.

WHEREAS, the State Board of Education:

- Recognizes that the State Board of Education, the Legislature, and the Governor have always held public education to be one of the highest priorities of this State.
- Believes that access to an essential education is a constitutional right of every child.
- Believes that providing an essential education for every child is the responsibility of the policymakers and citizens of Nebraska.
- Believes that schools should be defined, organized and financed so as to create the capacity to provide an essential education.

The State Board of Education goals also include: “Coordinate the promotion and support of appropriate uses of technology with educational service units (ESUs) and other providers to implement statewide training and professional development based on 21st Century vision for the appropriate uses of technology” and to “Support the implementation of a continuous transition for students, PreK-16”.

Section V: Technical Impact (20 Points)

7. Describe how the project enhances, changes or replaces present technology systems, or implements a new technology system. Describe the technical elements of the project, including hardware, software, and communications requirements. Describe the strengths and weaknesses of the proposed solution.

The aforementioned project, Distance Learning—Infrastructure, Programming, and Training, proposes to upgrade the existing Video/Data circuits to 164 high schools to flexible use, 45mbps circuits, capable of handling many different applications simultaneously in a high bandwidth, wide area networking topology. This will require installation of a router at every school as well as larger aggregation routers at central office provider facilities, serving regions of schools.

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The JPEG-series CoDecs, no longer supported by the manufacturer, will be replaced by new CoDecs, capable of H.263 or H.264 video compression protocols. The eLearning portion of the project will require purchase of primary and secondary content and management servers, some with load balancing capabilities. The new server farm will greatly increase the capacity to serve teachers and learners across the State. The eKnowledge repository will require purchase of a large-scale content server with several database servers attached to handle the content searches, submissions, and retrieval, and authentication of prospective customers.

The described technology implementation vastly improves the flexibility and availability of digital content resources for Nebraska students.

8. Address the following issues with respect to the proposed technology:

- Describe the reliability, security and scalability (future needs for growth or adaptation) of the technology.

The technology chosen conforms to all industry security specifications and provides a scalable platform for future enhancements to accommodate both additional numbers of learners as well as unanticipated technology applications. The wide area networking component is expected to serve education for seven years.

- Address conformity with applicable NITC technical standards and guidelines (available at <http://www.nitc.state.ne.us/standards/>) and generally accepted industry standards.

The technology chosen conforms with all applicable NITC technical standards and guidelines, especially the most recent Audio and Video Standards for Distance Learning and Videoconferencing.

- Address the compatibility with existing institutional and/or statewide infrastructure.

The technology chosen will be completely compatible with Network Nebraska and future Internet Protocol environments.

Section VI: Preliminary Plan for Implementation (10 Points)

8. Describe the preliminary plans for implementing the project. Identify project sponsor(s) and examine stakeholder acceptance. Describe the project team, including their roles, responsibilities, and experience.

Network Nebraska. The general timeframe for implementation of Network Nebraska and its associated educational applications for PreK-12 depends upon the rate at which PreK-12 customers leave their existing Internet service providers for Network Nebraska. For example, aggregations of school districts and ESUs are in the middle of Internet1 service contracts with private providers and are generally not able to consider other contracts until their existing contract terms expire. The 2004-05 Network Nebraska customer base is two major data aggregations of about 164 school districts (33%). It is possible that 90%-100% of the remaining school districts could join the network as early as July 1, 2005, pending e-Rate approval and reimbursement.

Statewide Synchronous Video Network. The basic video and data transport contracts for the distance learning consortia begin to expire in July 2006 with 48 schools expiring the first year.

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Network upgrade costs and equipment just to maintain distance learning and Internet access for 164 schools are estimated at \$55,000,000 over a seven-year contract which shall be met in part through local ongoing costs, e-Rate project reimbursement, Federal grants, provider capital investments, and the Nebraska Universal Service Fund. Additional funds shall be needed to complete the network replacement. Later contract expirations will be accelerated to compress the implementation of the network and the retirement of the obsolete JPEG video equipment.

Nebraska eLearning Initiative. The Nebraska eLearning Initiative for K-12 schools is in the earliest stages of implementation. Current user (student) licenses for 2004-05 number approximately 10,000 at \$4.00 per user. Growth projections anticipate 100% growth over the next few years with a potential penetration of 300,000 users. The greater the user base, the lower the licensing cost per user. Additional server resources will be needed. Massive digital content libraries are available at \$.70/user for a statewide license. The Nebraska eKnowledge repository will require server, database, and licensing fees for implementation.

9. List the major milestones and/or deliverables and provide a timeline for completing each.

Network Nebraska upgrades to local 45mbps circuits and associated hardware: Summer 2006 and Summer 2007

Statewide Synchronous Video Upgrade to 164 high schools; Summer 2006 and Summer 2007

Implementation of new eLearning infrastructure and server placement: July 2006 and ongoing

10. Describe the training and staff development requirements.

The project lists \$445,000 per year for training and support requirements for synchronous video distance learning and the eLearning Initiative. This will pay for qualified teacher trainers to establish staff development materials and will utilize the NWSDAC and ESU professional development personnel.

11. Describe the ongoing support requirements.

The overall project will require many miscellaneous service contracts on the servers, codecs, routers, and scheduling system. The eLearning system will require daytime helpdesk support for teacher users.

Section VII: Risk Assessment (10 Points)

13. Describe possible barriers and risks related to the project and the relative importance of each.

Barriers and risks to this project include local constituent consensus, provider pricing of network services at an affordable level, and potential implementation delays due to equipment backorders and the capacity of the provider companies to make large-scale upgrades and equipment replacements during the summer when schools are not in session.

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14. Identify strategies which have been developed to minimize risks.

The Nebraska Information Technology Commission has conducted numerous stakeholder meetings and discussions and have conducted numerous work group and task groups to arrive at the aforementioned project components and support mechanisms. Nebraska Department of Education and NITC staff will be allocated to oversee implementation of the project components and to maintain accountability of every dollar invested.

Section VIII: Financial Analysis and Budget (20 Points)

15. Financial Information

Network Nebraska

Account Description	FY 06 Adj Req	FY 07 Adj Req	Ongoing
Backbone Transport Costs (preK-12)	\$ 500,000	\$ 1,000,000	\$ 1,500,000
Subtotal	\$ 500,000	\$ 1,000,000	\$ 1,500,000

Statewide Synchronous Video Network

Account Description	FY 06 Adj Req	FY 07 Adj Req	Ongoing
School Site Router Hardware	\$ 800,000	\$ 800,000	\$ 0
School Site Router Maintenance	\$ 250,000	\$ 250,000	\$ 250,000
Aggregation Point Router Hardware	\$ 1,300,000	\$ 0	\$ 0
Aggregation Router Maintenance	\$ 200,000	\$ 200,000	\$ 200,000
School Site Codec Hardware	\$ 1,500,000	\$ 1,500,000	\$ 0
School site Codec Maintenance	\$ 200,000	\$ 200,000	\$ 200,000
Ancillary Equipment/LAN upgrades	\$ 1,200,000	\$ 1,700,000	\$ 500,000
Scheduling/Management system	\$ 745,000	\$ 725,000	\$ 350,000
Training and Support	\$ 200,000	\$ 200,000	\$ 200,000
Subtotal	\$ 6,395,000	\$ 5,575,000	\$ 1,700,000

eLearning Initiative and Knowledge Repository

Account Description	FY 06 Adj Req	FY 07 Adj Req	Ongoing
Course Mgt Software Licensing	\$ 60,000	\$ 100,000	\$ 160,000
Primary, Secondary Server/Licensing	\$ 175,000	\$ 330,000	\$ 295,000
Discovery Digital content library	\$ 125,000	\$ 250,000	\$ 250,000
Site-based content servers	\$ 1,650,000	\$ 1,650,000	\$ 0
Content server installation	\$ 300,000	\$ 300,000	\$ 0
Training and Support	\$ 245,000	\$ 245,000	\$ 245,000
eKnowledge Repository	\$ 300,000	\$ 300,000	\$ 300,000
Acute content shortage resources	\$ 250,000	\$ 250,000	\$ 250,000
Subtotal	\$ 3,105,000	\$ 3,425,000	\$ 1,500,000

16. Provide a detailed description of the budget items listed above. Include:

- An itemized list of hardware and software.

This information will be available after the design phase of the project.

- If new FTE positions are included in the request, please provide a breakdown by position, including separate totals for salary and fringe benefits.

Not applicable.

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- Provide any on-going operation and replacement costs not included above, including funding source if known.

See Question 15.

- Provide a breakdown of all non-state funding sources and funds provided per source.

Local recurring payments	\$22,000,000 FY 2006-2013
ERate Discounts	\$33,000,000 FY 2006-2013
Possible Congressional Funding	\$10,000,000 FY 2005-2006

17. Please indicate where the funding requested for this project can be found in the agency budget request, including program numbers.

Forthcoming information.