



Broadband in Nebraska

Current Landscape and Recommendations

Dec. 22, 2014

2014

Updated With Progress
in Achieving Broadband Goals
September 2018

Nebraska Information Technology Commission

Nebraska Broadband Initiative

Nebraska Public Service Commission

University of Nebraska-Lincoln

NITC Community Council

Nebraska Department of Economic Development

AIM



The Nebraska Information Technology Commission (nitc.nebraska.gov) promotes the use of information technology in education, health care, economic development, and all levels of government service. The nine-member, governor-appointed commission is chaired by Lieutenant Governor John E. Nelson..

The Nebraska Broadband Initiative (broadband.nebraska.gov) promotes the adoption and utilization of broadband in Nebraska. Project partners include the Nebraska Public Service Commission, University of Nebraska-Lincoln, Nebraska Information Technology Commission, Nebraska Department of Economic Development, and AIM. Activities include the development of a state broadband map (broadbandmap.nebraska.gov), state broadband conferences, videos highlighting how broadband is being used in Nebraska communities, surveys of households and businesses, regional broadband plans, community planning materials, and these recommendations.

The project is funded through a grant to the Nebraska Public Service Commission by the U.S. Department of Commerce's National Telecommunications and Information Administration through the American Recovery and Reinvestment Act.



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Foreword



Dave Heineman
Governor

State of Nebraska

Office of the Chief Information Officer
Brenda L. Decker
Chief Information Officer

My Fellow Nebraskans:

Nebraska is making significant progress in broadband development. Nearly all Nebraskans have broadband access to the Internet, and broadband speeds across the state are increasing. Nebraska businesses are creating jobs and increasing revenue through the use of broadband. Agricultural producers are also using broadband applications to monitor livestock and crops. Nebraska's tech sector continues to grow and is drawing national attention. Innovative programs at our colleges and universities are training our next generation of IT workers and entrepreneurs.

This broadband plan discusses the current broadband landscape in Nebraska and presents ten recommendations to help stakeholders in Nebraska build upon our successes and ensure that Nebraska continues to enjoy the benefits of broadband in the future.

I would like to thank the NITC Community Council, the Nebraska Public Service Commission, University of Nebraska-Lincoln, Nebraska Department of Economic Development, AIM, and other stakeholders for their contributions.

Sincerely,

Brenda L. Decker

Brenda L. Decker
Chief Information Officer



Brenda L. Decker
Chief Information Officer

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Executive Summary

Vision, Objectives and Goals

Nebraska's broadband vision is that residents, businesses, government entities, community partners, and visitors have access to affordable broadband service and have the necessary skills to effectively utilize broadband technologies.

Objectives

- To increase economic development opportunities, create good-paying jobs, attract and retain population, overcome the barriers of distance, and enhance quality of life in Nebraska by stimulating the continuing deployment of broadband technologies which meet the need for increasing connection speeds.
- To increase digital literacy and the widespread adoption of broadband technologies in business, agriculture, health care, education, government and by individual Nebraskans.

Goals

The following goals and targets help focus attention on key aspects of the plan and provide a way to assess the state's progress in addressing broadband development:

Increase household adoption of broadband

- Over 90% of households statewide will subscribe to broadband by 2020.
- 85% of households in rural Nebraska will subscribe to broadband by 2020.

Increase broadband availability

- Broadband service of 25 Mbps down will be available to 90% of households by 2020.
- Broadband service of 1 gbps down will be available to 25% of households by 2020.

Support broadband-related development by increasing the number and diversity of IT workers

- At least 1,400 degrees in computer and information science, management information systems, computer engineering, and bioinformatics will be awarded annually by Nebraska colleges and universities by 2020.
- Women receive at least 25% of the degrees in computer and information science, management information systems, computer engineering, and bioinformatics will be awarded by Nebraska colleges and universities by 2020.

Nebraska's broadband vision is that residents, businesses, government entities, community partners, and visitors have access to affordable broadband service and have the necessary skills to effectively utilize broadband technologies.

Executive Summary

Economic Impact

Broadband is impacting Nebraska's economy in a number of ways¹, including:

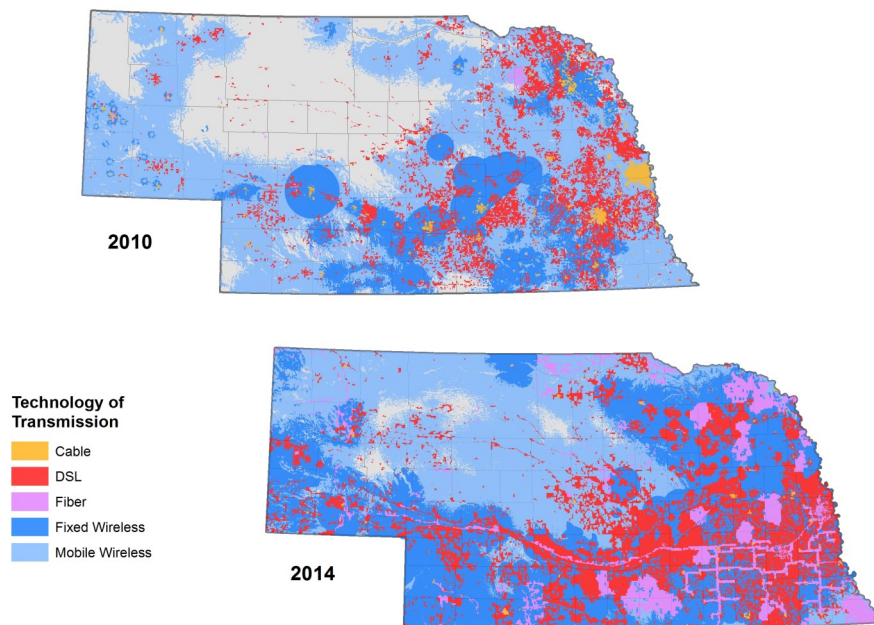
- **Expanding Markets by Selling Online.** Over 60% of Nebraska businesses reported selling goods or services online.
- **Increasing Efficiencies and Reducing Costs.** Nebraska businesses reported cost savings averaging 4% due to using the Internet.
- **Creating Jobs.** A 2013 survey of Nebraska businesses found that broadband access to the Internet is having a positive impact on jobs, with 364 respondents reporting a net increase of 654 jobs due to using the Internet.
- **Increasing Revenue.** Broadband access to the Internet is also having a positive impact on business revenue with typical respondents reporting 25 to 45 percent of revenue from the Internet.

National and international research links broadband availability with economic growth. However, broadband adoption appears to have a stronger economic impact than broadband availability, contributing to growth in household income, lower unemployment and other measures of economic success in non-metropolitan counties.²

Broadband Availability

Broadband provides high-speed access to applications such as the Internet. Broadband service is available to nearly all Nebraskans, with 99.5% of Nebraskans having access to service with download speeds of greater than 10 Mbps.³ Nebraska ties for 12th on this measure.

Broadband access to the Internet is also having a positive impact on business revenue with typical respondents reporting 25 to 45 percent of revenue from the Internet.



Executive Summary

Broadband availability in Nebraska continues to improve. The map on the previous page shows improvements in broadband coverage from 2010 to 2014. Some areas of the state remain unserved, however.⁴

Mobile connections are becoming increasingly important to residents and businesses with over 80% of Nebraska businesses currently using smart phones.⁵ Although mobile broadband data coverage is improving in Nebraska, mobile coverage in some areas of rural Nebraska is still a challenge. Mobile coverage limitations in rural areas of Nebraska may impact the adoption and utilization of some precision agriculture technologies which rely on mobile broadband services.

Broadband Adoption

Most households in Nebraska (82%) have broadband service. However, there are significant rural-urban differences with subscription rates of 90% in Lincoln and 87% in Omaha, compared to 72% to 77% in other regions of the state.⁶

Nearly all Nebraska businesses are utilizing broadband access to the Internet. Internet applications relying on broadband networks are becoming increasingly important for agricultural producers. Most livestock producers use the Internet for market information, auctions, government and regulatory agency reporting, and farm business planning. Most grain producers use the Internet for market information, crop management, government and regulatory agency reporting, ROI calculators, farm business planning, and GPS information.⁷

Recommendations

The following recommendations emerged from discussions with stakeholders:

- Encourage investment in Nebraska's telecommunications infrastructure.
- Enhance the capacity of local communities to address broadband development.
- Encourage the development of a skilled IT workforce.
- Support innovation and entrepreneurship.
- Support the use of broadband technologies in businesses and agriculture.
- Support the development of libraries as community anchor institutions.
- Support the use of broadband in education and health care.
- Support the use of broadband by government and public safety entities.
- Support efforts to attract new residents and retain youth.
- Increase digital literacy and broadband access to the Internet.

***B**roadband adoption appears to have a stronger economic impact than broadband availability.*

What Is Broadband?

What is Broadband?

"Broadband" refers to a high-speed data service that supports multiple applications including access to the Internet. Broadband access to the Internet can be provided through a number of technologies, including cable modem, Digital Subscriber Line (DSL), fiber, wireless, and satellite. There is no single universally-agreed up on definition regarding how fast a connection should be to be considered "broadband." To most users, anything faster than dial-up is considered "broadband." The National Broadband Plan released by the FCC in 2010 has defined broadband as 4 Mbps down and 1 Mbps up. In August 2014, the FCC launched an inquiry into changing the definition to 10 Mbps down and 1 Mbps up. The proposed change reflects the demand for increasing broadband speeds.

Bandwidth, streaming video and download times

Video downloads or video streaming can demand broadband speeds of 5 Mbps or greater depending upon the size of the file or quality of the video being streamed. Standard definition video can be streamed at speeds from 1 Mbps to 2 Mbps. High quality video demands faster speeds, with full HD (1080p) demanding 5 Mbps or more for a single stream. Having multiple members of a household simultaneously streaming video on separate devices will require even greater connection speeds

Connection Speed	Single song (5 MB)	Album 100 MB	TV Show 450 MB
4 Mbps	10 seconds	3 minutes 20 seconds	15 minutes
8 Mbps	5 seconds	1 minute 40 seconds	7 minutes 30 seconds
16 Mbps	2.5 seconds	50 seconds	3 minutes 45 seconds
32 Mbps	1.25 seconds	25 seconds	1 minute 52 seconds
50 Mbps	.8 seconds	16 seconds	1 minute 12 seconds
100 Mbps	.4 seconds	18 seconds	36 seconds

Upload Speed

The speed at which you can send information from your computer or device over the Internet is important for applications like video conferencing, sharing larger files online, interactive learning, medical applications that use HD imaging, and two-way online gaming – as well as advanced "cloud computing."

Vision, Objectives and Goals

Broadband is essential to Nebraskans. Broadband is a way:

- To connect with friends and family,
- To shop,
- To access information,
- To play games, listen to music, and watch videos,
- To access education and training,
- To access health information and care,
- To better manage our health,
- To generate business revenue and jobs,
- To more efficiently farm and raise livestock,
- To better manage resources, and
- To attract new residents and retain youth.

Vision

Nebraska's broadband vision is that residents, businesses, government entities, community partners, and visitors have access to affordable broadband service and have the necessary skills to effectively utilize broadband technologies.

Objectives

- To increase economic development opportunities, create good-paying jobs, attract and retain population, overcome the barriers of distance, and enhance quality of life in Nebraska by stimulating the continuing deployment of broadband technologies which meet the need for increasing connection speeds.
- To increase digital literacy and the widespread adoption of broadband technologies in business, agriculture, health care, education, government and by individual Nebraskans.

Goals

The following goals and targets help focus attention on key aspects of the plan and provide a way to assess the state's progress in addressing broadband development:

Increase household adoption of broadband

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- 85% of households in rural Nebraska will subscribe to broadband by 2020.

Increase broadband availability

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Vision, Objectives and Goals

- Broadband service of 25 Mbps down will be available to 90% of households by 2020.
- Broadband service of 1 gbps down will be available to 25% of households by 2020.

Support broadband-related development by increasing the number and diversity of IT workers

- At least 1,400 degrees in computer and information science, management information systems, computer engineering, and bioinformatics will be awarded annually by Nebraska colleges and universities by 2020.
- Women receive at least 25% of the degrees in computer and information science, management information systems, computer engineering, and bioinformatics will be awarded by Nebraska colleges and universities by 2020.

2014 Baseline and Targets

Measure	Baseline	2020 Target
Subscription to broadband service by Households in Nebraska ⁸	82%	Over 90%
Subscription to broadband service by households in nonmetropolitan Nebraska	73.6%	85%
% of households with broadband service of at least 25 Mbps down available ⁹	74.9%	90%
% of households with broadband service of 1 gbps down available	11.5%	25%
Degrees awarded in computer and information science, engineering, and engineering technologies by Nebraska colleges and universities ¹⁰	1,113	1,400
% of computer and information science, engineering, and engineering technologies degrees awarded to women by Nebraska colleges and universities	20%	At least 25%

Broadband Landscape

Economic Impact

Broadband is impacting Nebraska's economy in a number of ways, including:

- **Expanding Markets by Selling Online.** Over 60% of Nebraska businesses reported selling goods or services online.¹¹ Additionally, Google reports that 6,000 Nebraska businesses and non-profits used Google's advertising programs, generating an estimated \$1.4 billion in economic activity in 2013.¹²
- **Increasing Efficiencies and Reducing Costs.** Nebraska businesses reported cost savings averaging 4% due to using the Internet.¹³
- **Creating Jobs.** A 2013 survey of Nebraska businesses found that broadband access to the Internet is having a positive impact on jobs, with 364 respondents reporting a net increase of 654 jobs due to using the Internet.¹⁴
- **Increasing Revenue.** Broadband access to the Internet is also having a positive impact on business revenue with typical respondents reporting 25 to 45 percent of revenue from the Internet.¹⁵

364 businesses
reported an increase of
654 jobs
due to the
Internet

Broadband adoption appears to have a stronger economic impact than broadband availability.

National and international research links broadband availability with economic growth. Ericsson estimates that doubling broadband speeds for an economy can add 0.3 percent to GDP growth.¹⁶ Another study found that non-metropolitan counties with broadband available at higher speeds experienced greater growth in the percentage of employees in the creative class.¹⁷

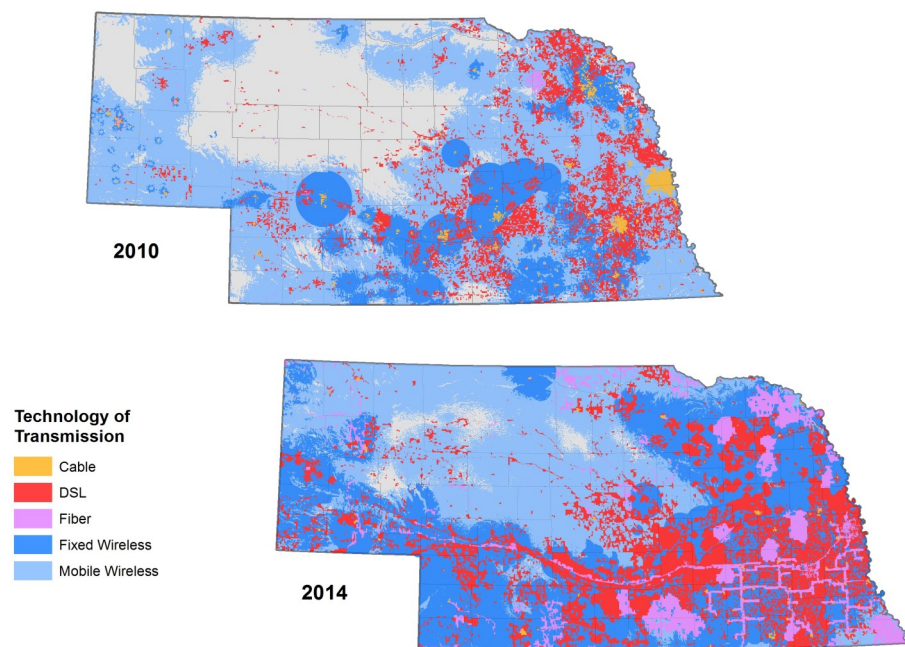
However, broadband adoption appears to have a stronger economic impact than broadband availability. One study found that broadband adoption—rather than broadband availability—contributes to growth in household income, lower unemployment and other measures of economic success in non-metropolitan counties.¹⁸

Broadband Landscape

Broadband Availability

Broadband service is available to nearly all Nebraskans, with 99.5% of Nebraskans having access to service with download speeds of greater than 10 Mbps. Nebraska ties for 12th on this measure.¹⁹ Although broadband availability in Nebraska continues to improve, some areas of the state remain unserved. The map below shows improvements in broadband coverage between 2010 and late 2013.²⁰ The data displayed on the map below and the maps on the following page was collected during the spring 2014 collection period and reflects coverage information as of June 30, 2014.

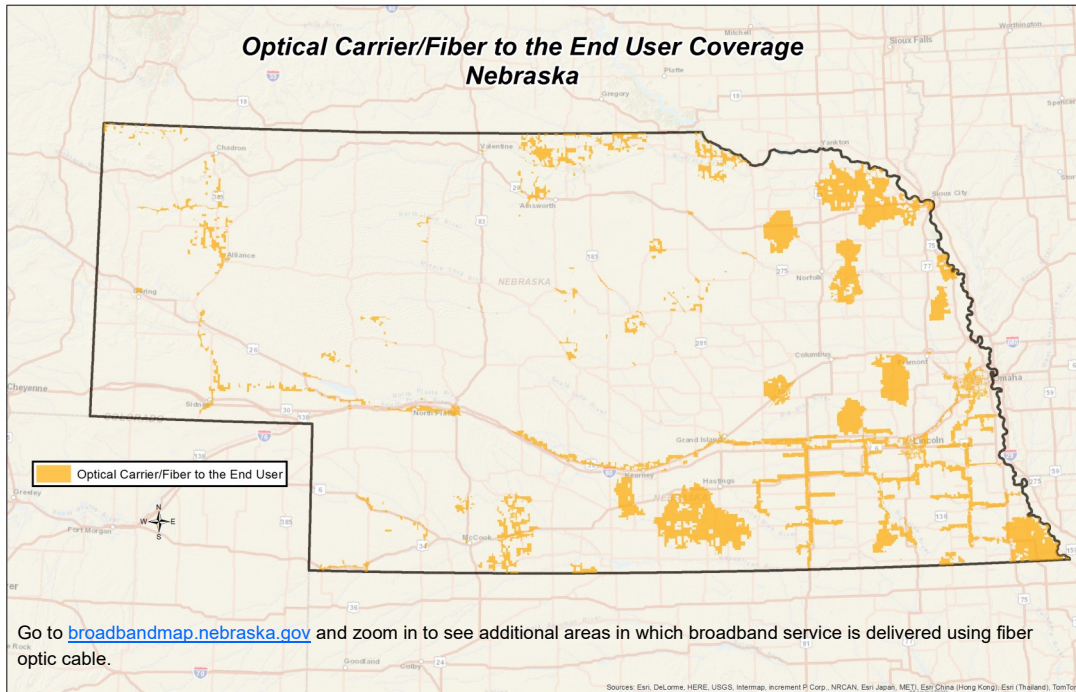
Broadband service is available to nearly all Nebraskans.



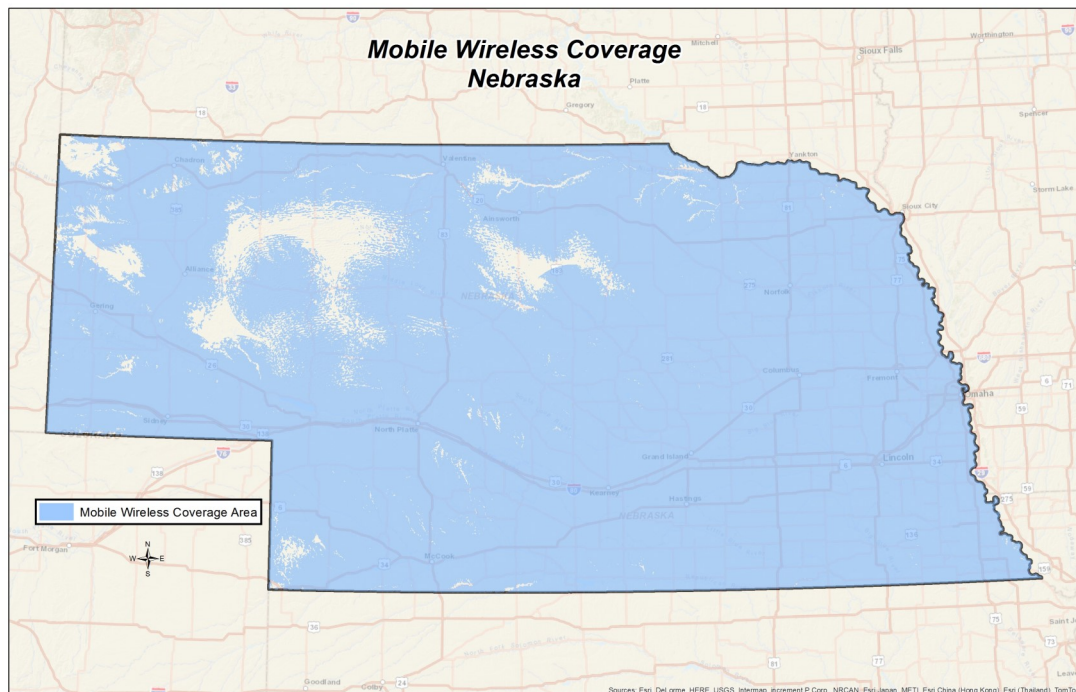
The deployment of fiber in Nebraska is increasing. The map on the following page reflects locations where fiber is the technology used to provide broadband access based on data. Going to the broadband map (broadbandmap.nebraska.gov) and zooming in shows additional areas in which broadband service is delivered using fiber optic cable.

Mobile connections are becoming increasingly important to residents and businesses. Over 88 percent of Nebraska businesses use some form of web-enabled mobile device, with 84% using a web-enabled laptop computer, closely followed by web-enabled mobile phones (81.3%).²¹ Although mobile broadband data coverage is improving in Nebraska, mobile coverage in some areas of rural Nebraska is still a challenge. These coverage limitations may impact the adoption and utilization of some precision agriculture technologies which rely on mobile broadband services. The map on the following page shows mobile wireless coverage in Nebraska.

Broadband Landscape



The deployment of fiber in Nebraska is increasing.



Broadband Landscape

Broadband Adoption

Households. Most households in Nebraska (82%) access the Internet using their broadband service. However, there are significant rural-urban differences in broadband adoption. Ninety percent of households in the Lincoln area and 87% of households in the Omaha have broadband access to the Internet. In comparison, the percentage of households with broadband access to the Internet in other regions of the state ranges from 72% to 77%.²²

Older adults, those with lower incomes and those with lower levels of income are also less likely to have broadband access to the Internet at home.

Businesses. Nebraska businesses are utilizing broadband to expand their markets and reduce costs. More importantly, these businesses are creating jobs and increasing revenue through the use of broadband. A

2013 survey of Nebraska businesses found that broadband access to the Internet is having a positive impact on jobs, with 364 respondents reporting a net increase of 654 jobs due to using the Internet. Over 50% of net jobs reported by respondents were attributed to use of the Internet. Broadband access to the Internet is also having a positive impact on business revenue with typical respondents reporting 25 to 45 percent of revenue from the Internet.²³

Agriculture. Broadband applications are becoming increasingly important for agricultural producers with over 60% of livestock producers using the Internet for commodity prices/market information (69%), government/regulatory agency reporting (63%), and auctions (63%).

At least 60% of grain producers report using broadband for commodity prices/market information (77%), crop management (65%), and government or regulatory agency reporting (60%).²⁴

Satisfaction and Affordability. Most businesses and households are generally satisfied with their Internet service. However, the majority of households and nearly a quarter of businesses expressed dissatisfaction with the price of their service. Fiber is considered the best value of all technologies by both businesses and households despite its higher average monthly cost.²⁵

Broadband Service at Home	2010	2014
Nebraska Households with Broadband Service at Home	76%	82%
By Region		
Lincoln Area	81%	90%
Omaha Area	83%	87%
Southeast	72%	77%
South Central	69%	76%
West Central	70%	74%
Panhandle	74%	73%
Central	56%	73%
Northeast	72%	72%

*For the survey, broadband was defined as anything faster than dial-up.

There are significant rural-urban differences in broadband adoption.

Priority Areas and Recommendations

Four priority areas were identified by nine regional groups in Nebraska working to develop regional broadband plans. These priority areas are:

- Economic Development
- Agriculture
- Digital Literacy and Public Access
- Broadband Availability and Affordability

The regional groups also recognized that the use of broadband in health care, education, local government and libraries were important, but were issues that were better addressed at the state level.

These priority areas were presented to members of the Nebraska Information Technology Commission Community Council and other stakeholders on November 1, 2013. Community Council members and other stakeholders were invited to participate in work groups to further discuss these priority areas and make initial recommendations.

The following recommendations emerged from discussions with work group members and the Community Council:

- Encourage investment in Nebraska's telecommunications infrastructure.
- Enhance the capacity of local communities to address broadband development.
- Encourage the development of a skilled IT workforce.
- Support innovation and entrepreneurship.
- Support the use of broadband technologies in businesses and agriculture.
- Support the development of libraries as community anchor institutions.
- Support the use of broadband technologies in education and health care.
- Support the use of broadband by government and public safety entities.
- Support efforts to attract new residents and retain youth.
- Increase digital literacy and broadband access to the Internet.

Priority Areas and Recommendations

Encourage Investment in Nebraska's Telecommunications Infrastructure

The State of Nebraska encourages investment in Nebraska's telecommunications infrastructure through two primary mechanisms:

- By providing support through the Nebraska Universal Service Fund; and
- By aggregating its demand for telecommunications services and acting as an anchor tenant.

Additionally, ways to leverage investments in FirstNet and Next Generation 911 should be explored.

Provide Support through the Nebraska Universal Service Fund

In 1997, the Legislature passed LB 686, authorizing the Nebraska Public Service Commission to create the Nebraska Universal Service Fund (NUSF). The goal of the NUSF is, in conjunction with federal universal service funds, to ensure that all Nebraskans have comparable access to telecommunications services at affordable prices. The Commission created the following five programs within the NUSF:

Broadband Program provides targeted support for unserved and underserved areas to close the broadband availability gap. Nebraska Broadband grants are available to regulated wireline, wireless, and unregulated communications providers wishing to participate. \$500,000 in support has been earmarked in 2015 to initiate a pilot broadband adoption program. Nebraska is one of only four states in the nation with a universal service program to fund broadband deployment, and it provides the second greatest amount of total funding among the states with such programs.

Dedicated Wireless Fund Program supports the provision of wireless telecommunications infrastructure in rural unserved and underserved areas of the state. In 2014 the Commission combined the Dedicated Wireless Fund Program and the Nebraska Broadband Program.

Rural Tele-Health Program provides support for the Nebraska Statewide Telehealth Network. The Nebraska Statewide Telehealth Network connects 68 rural and critical access hospitals across the state to hub hospitals in Grand Island, Kearney, Lincoln, Norfolk, North Platte, Omaha, and Scottsbluff.

Nebraska Telephone Assistance Program assists eligible low-income individuals with obtaining and keeping telephone services by lowering monthly telephone service rates. In February of 2012, the FCC significantly reformed the low-income program supported by the federal and state universal service funds and began taking steps toward expanding the program to include broadband service. The Commission continues to monitor the Pilot Programs closely.

High Cost Program seeks to make telecommunications and information rates generally affordable and comparable across Nebraska by providing support to the highest-cost areas.

The Commission has maintained the NUSF surcharge at 6.95% of in-state retail

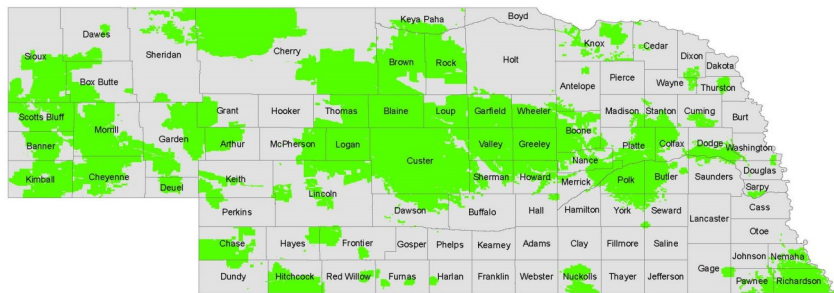
The goal of the NUSF is, in conjunction with federal universal service funds, to ensure that all Nebraskans have comparable access to telecommunications services at affordable prices.

Priority Areas and Recommendations

telecommunications revenue since 2007. Twenty-one states have state funds specifically dedicated to providing high-cost support and 8 states have funds dedicated to funding intrastate access rate reductions and reform. The percentage assessed by each state varies widely along with the method of assessment. Nebraska's assessment percentage falls near the middle.

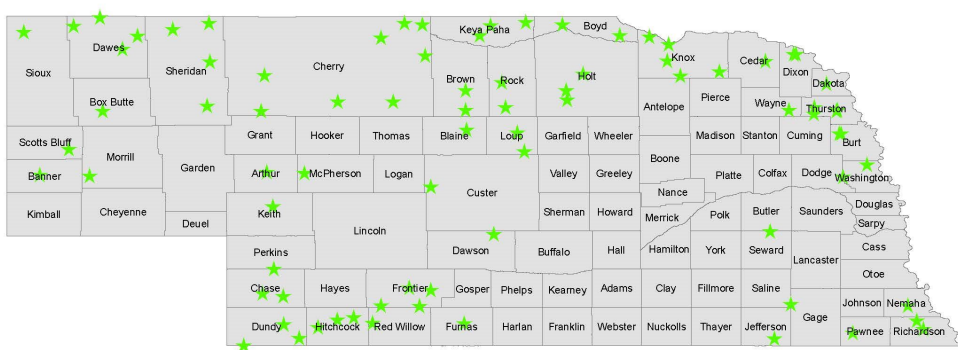
The maps on this page show the areas receiving support from the Nebraska Broadband Program and the Dedicated Wireless Program.

Nebraska Universal Service Fund Broadband Grant Locations Nebraska Broadband Pilot Program (2012-2014)



NEBP Grant Locations
2012-2014

Nebraska Universal Service Fund Supported Tower Locations Dedicated Wireless Program (2008 - 2013)



NUSF Supported Towers
2008 - 2013

Priority Areas and Recommendations

Aggregate Demand and Act as an Anchor Tenant

The Nebraska Information Technology Commission facilitated the aggregation of the backbone network services of the State of Nebraska and the University of Nebraska into a core network backbone segment in 2003 in order to develop a broadband, scalable telecommunications infrastructure that optimizes quality of service to public entities. In 2006, the network expanded to include the state's educational entities with the passage of LB 1208.

[Network Nebraska](#) is comprised of three major sub-networks: The University of Nebraska Computing Services Network, State and County Government Network, and Network Nebraska-Education. Each network has its own management staff and backbones, but takes advantage of co-location facilities, Internet and telecommunications contracts, and shared infrastructure wherever possible.

Network Nebraska-Education has enabled the exchange of video distance learning classes and decreased the cost of commodity Internet for participating K-12 entities. Nebraska K-20 education now enjoys one of the lowest unit costs for commodity Internet in the entire country. Over 270 entities participate in Network Nebraska-Education. Network Nebraska-Education was recognized by the National Association of State CIOs (NASCIO) as an outstanding collaborative and partnership project in 2013.

Benefits of Network Nebraska also include flexible bandwidth utilization, Intranet routing, lower network costs, greater efficiency, interoperability of systems providing video courses and conferencing, increased collaboration among educational entities, new student learning opportunities, enterprise network management software, and better use of public investments.

Network Nebraska has stimulated investments in telecommunications infrastructure. As the State bid connectivity to large regional areas of schools and colleges, the telecommunications companies responded with new network technologies such as metropolitan optical Ethernet, multi-protocol label switching (MPLS), and Ethernet "clouds", which have provided benefits for other nonpublic entities. Network Nebraska is not a state-owned network. Facilities and circuits are leased from private telecommunications providers in the state, allowing the State of Nebraska to act as an anchor tenant.

The University of Nebraska Computing Services Network has also provided support and assistance to the Nebraska Statewide Telehealth Network which connects nearly all of Nebraska's hospitals and public health departments in one of the country's most extensive telehealth networks.

Network Nebraska has been made possible through a cooperative effort of the Collaborative Aggregation Partnership (CAP). CAP is composed of several operational entities: Office of the CIO, University of Nebraska, and Nebraska Educational Telecommunications with policy assistance from the Nebraska Department of Education, Public Service Commission, and the Nebraska Information Technology Commission.

Network Nebraska-Education has enabled the exchange of video distance learning classes and decreased the cost of commodity Internet for participating K-12 entities. Nebraska K-20 education now enjoys one of the lowest unit costs for commodity Internet in the entire country.

Priority Areas and Recommendations

Explore Ways to Leverage FirstNet and Next Generation 911 Investments

Two public safety-related initiatives—FirstNet and Next Generation 911—will require significant investments in broadband infrastructure. Ways to leverage these investments should be explored as plans are made.

FirstNet will provide mission-critical, high-speed data services to supplement the voice capabilities of current Land Mobile Radio (LMR) networks. It will be used to send data, video, images, and text. FirstNet will also carry location information and eventually support streaming video. FirstNet also plans to offer cellular voice communications such as Voice over Long Term Evolution (VoLTE) or other alternatives. The FirstNet network will not become a viable replacement for LMR until the availability of mission-critical voice functionality that meets or exceeds the needs of public safety agencies.

FirstNet is a federal initiative created by the Middle Class Tax Relief and Job Creation Act in 2012. The law gives FirstNet the duty to build, operate and maintain a high-speed, nationwide wireless broadband network for public safety communications. FirstNet is governed by a 15-member board composed of representatives from public safety; local, state, and federal government; and the wireless industry.

Nebraska received \$1.5 million in federal funding from the U. S. Department of Commerce National Telecommunications and Information Administration to support planning, consultation, and data collection activities. A kickoff for the Nebraska planning effort was held in December 2013 with 120 attendees. FirstNet will schedule a consultation with each state and will then present a plan to the Governor. Governors have 90 days in which to opt in to the FirstNet plan or to opt out and plan their own system.

Next Generation 911 is the next stage in developing a 911 system compatible with today's communications technologies. 911 services have evolved from a system designed to receive location information on landline calls from telecommunications providers to Enhanced 911 systems which allow a Public Service Answering Point (PSAP) to determine the location of a wireless call origination to within 300 meters. Current technology locates a call to the center of the street, but not the building or location within a building.

Next Generation 911 is an Internet Protocol (IP)-based system designed to enable dispatchers to move data including photos and video to responders without negatively impacting response time. In 2013, the Legislature passed LB 595 to provide for a study of Next Generation 911. A final report of the study was presented to the Nebraska Public Service Commission in March 2014. Because the current statutory and regulatory framework for the management and funding of 911 services in Nebraska was not designed to support a statewide Next Generation 911 system, legislation may be needed regarding funding and governance.

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Next Generation 911 is the next stage in developing a 911 system compatible with today's communications technologies.

Priority Areas and Recommendations

Enhance the Capacity of Local Communities to Address Broadband Development

Local broadband-related development usually starts with government, businesses, and educational entities coming together to address the challenges facing the community or region. Broadband-related development doesn't require community leaders who know all of the answers. It does, however, require community leaders who have the passion and commitment to find the answers. A sense of hope for a better future helps sustain initial efforts. Collaborating on small projects builds trust and social capital. Community partners then work together on bigger projects which address:

- Technology adoption,
- Developing a skilled IT workforce,
- Innovation and entrepreneurship,
- Broadband availability and affordability,
- And quality of life.

This can lead to economic growth and job creation.

The following model shows the key elements of broadband-related development.

Broadband-Related Development



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Priority Areas and Recommendations

Encourage the Development of a Skilled IT Workforce

The availability and development of a skilled IT workforce is a key need in Nebraska. As a response, institutions of higher education in Nebraska are making efforts to increase the number of IT graduates. Code schools in Omaha and Lincoln are also addressing the need for a skilled IT workforce by providing intensive training to participants over a 12-week period. However, many employers still report a shortfall. Businesses outside of Omaha and Lincoln may find it even harder to recruit IT employees.

Efforts to engage young people to go into IT should start in grade school. Young people begin to form opinions of careers around third grade. However, many young people don't have a good idea of what IT workers do. There are several innovative programs, including both in school and after school programs, which are introducing students to coding. Resources like those from the [Khan Academy](#), MIT's [Scratch](#), and Google's [Made to Code](#) program can be used to teach coding to students.

Several programs target junior and high school students. [Nebraskacareertours.com](#) provides information on jobs in several industries including IT. Career academies and programs like [First Job Lincoln](#) can encourage students to choose a career in IT and help students develop the necessary skills to enter the IT workforce. [Code Crush](#) is a four-day five-night immersion experience for 8th and 9th grade girls to show them the world of IT. The event was hosted by the UNO College of Information Science and Technology in the spring of 2014 with support from Google and Women Investing in Nebraska.

Nationally, Code.org is encouraging states to count computer science towards high school math and science requirements for graduation. Twenty-three states now count computer science credits for graduation requirements.²⁶

A skilled workforce also requires workers knowledgeable on software commonly used in businesses. The Nebraska Department of Education is partnering with Microsoft on a Microsoft Academy program to allow students to receive Microsoft Office Certification. The program includes training for teachers and site licenses for certifications. The program is expected to begin rolling out in the fall of 2014, beginning with the training of teachers. Students are expected to begin taking certification tests in the spring semester of 2015.

Intern Nebraska connects full-time students at Nebraska postsecondary educational institutions and Nebraska residents attending postsecondary educational institutions in other states with businesses and non-profit organizations looking for interns. As of spring 2014, 415 students have been placed with approximately 40% of the interns placed outside of the Omaha and Lincoln metropolitan areas. Approximately 50% of the interns are offered full-time positions.



A mentor works with young people at the April 26 Coder Dojo in Lincoln.

The availability and development of a skilled IT workforce is a key need in Nebraska.

Priority Areas and Recommendations

Support Innovation and Entrepreneurship

Over the past several years, Nebraska has made significant progress in supporting technology-related development, innovation and entrepreneurship—especially in the Omaha and Lincoln areas—through University programs, code schools, accelerators, contests, conferences, meet ups, maker spaces, coworking facilities, and venture capital firms.

Smaller communities are also leveraging innovation and entrepreneurship to create jobs and economic growth. Xpansion has pioneered a rural sourcing model, providing a complete range of software quality assurance services in rural locations including Kearney, Nebraska; Loup City, Nebraska; Ames, Iowa; and Manhattan, Kansas. Brent Comstock, chief innovator and owner of Bcom Solutions, has started a coworking facility in Auburn. Alliance was the pilot site for [Bella Minds](#), a crowd-funded technology training program for digitally literate rural women who want to improve their technology skills.

Nebraska's Ranking on State Entrepreneurship Index Climbs

Year	Ranking
2011	24
2012	16

Source: Thompson, E. & Walstad, W. State Entrepreneurship Index (Dec. 1, 2013)
University of Nebraska-Lincoln Bureau of Business Research

Nebraska has made significant progress in supporting technology-related development, innovation and entrepreneurship.

What is a Maker Space?

A maker space is a space with tools and equipment where individuals can come together to work on projects and interact with others. It can be associated with a university, community college, high school, library, or just a group of individuals interested in making things. Maker spaces often charge a fee for access.

Maker spaces can lower the barriers to entry for startups by offering low-cost access to equipment which can be used to develop prototypes. The synergy created in maker spaces may be the biggest benefit, however.

Shane Farritor, a professor of mechanical and materials engineering and member of the committee, is leading the Maker Space effort at UNL's Innovation Campus.

"Nebraska is full of makers," Farritor said. "There are so many talented kids who grow up in rural areas building and creating things. It's one of the things I respect most about the state. It is also the reason why I believe the Maker Space will be a success."

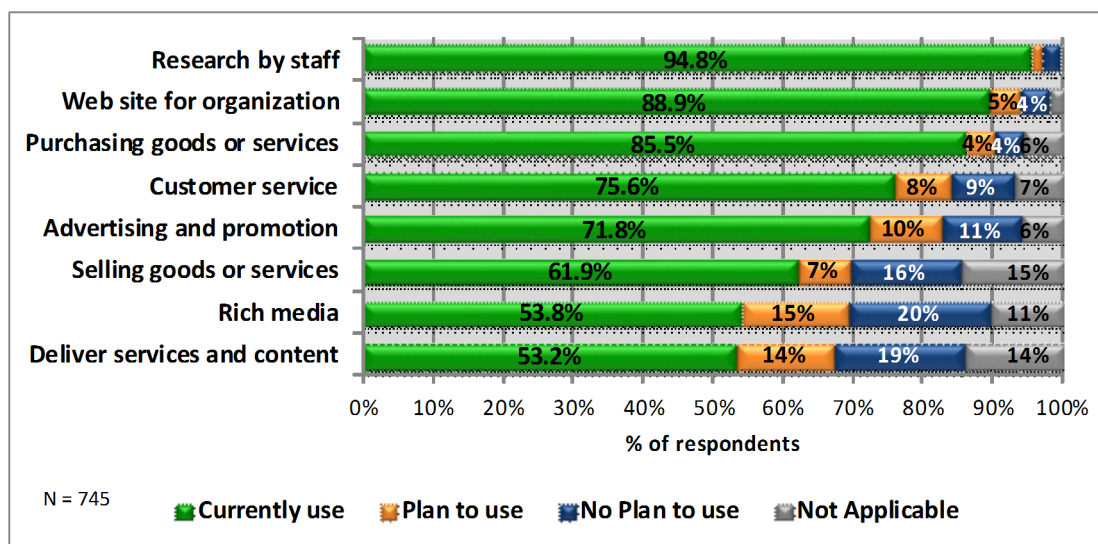
For more information on the UNL Maker Space and Club, visit make.unl.edu. Other maker spaces in Nebraska include the [Omaha Maker Group](#) and [Metropolitan Community College Fab Lab](#).

Priority Areas and Recommendations

Support the Use of Broadband in Businesses and Agriculture

Broadband Use in Nebraska Businesses. Nearly all Nebraska businesses are using broadband access to the Internet to expand their markets and reduce costs, according to a 2013 survey of Nebraska businesses.²⁷ The chart below shows high usage levels of many business applications. Businesses in rural areas of the state on average, however, used fewer e-commerce applications than businesses in the Omaha and Lincoln areas.

e-Commerce Uses of Broadband



Nearly all Nebraska businesses are using broadband access to the Internet to expand their markets and reduce costs.

Source: [Nebraska Broadband eSolutions Benchmarking Report, 2013](#)

Broadband use is having a positive impact on jobs with 364 respondents reporting a net increase of 654 jobs due to using the Internet. Over 50% of net jobs reported by respondents were attributed to use of the Internet. Broadband use is also having a positive impact on business revenue with typical respondents reporting 25 to 45 percent of revenue from the Internet.

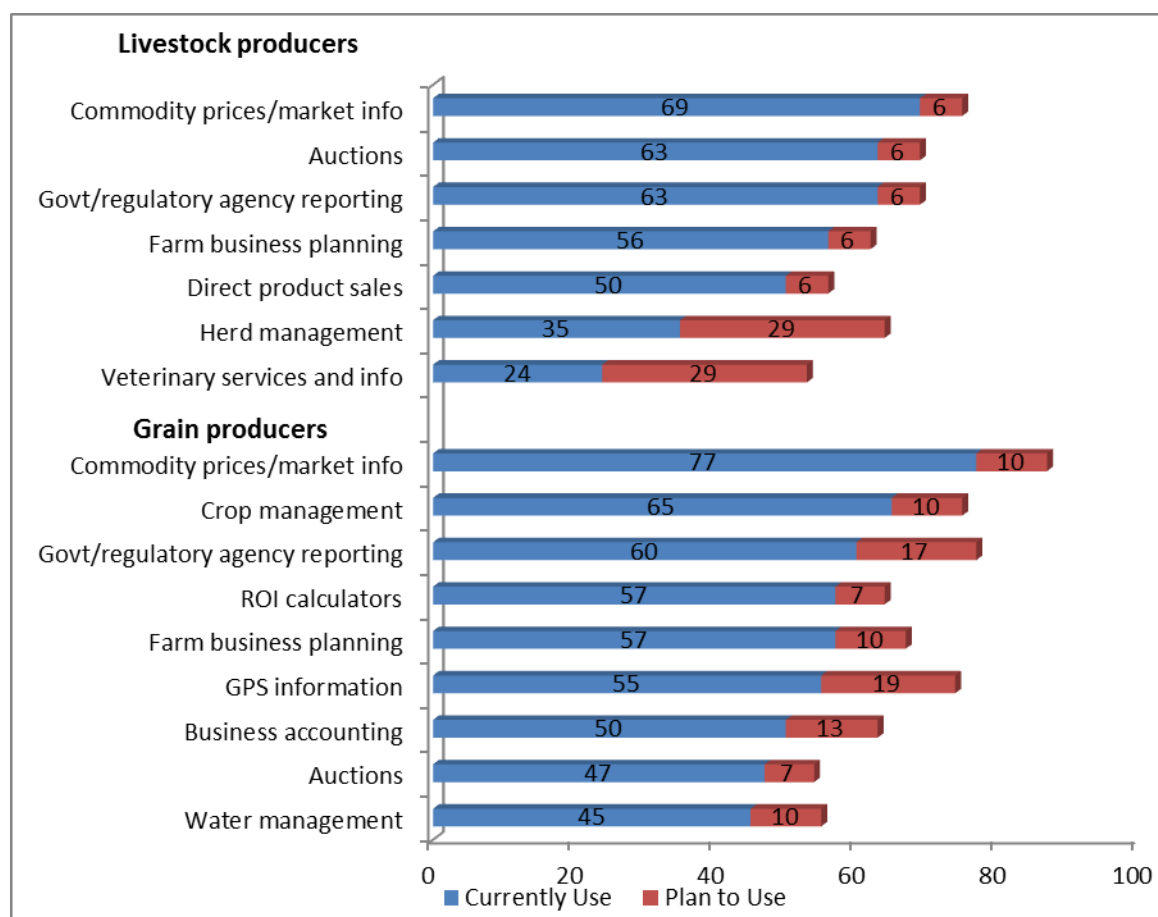
Conferences, workshops, lunch and learn sessions, and other educational opportunities can help businesses keep up with new technologies. AIM's [InfoTec](#) conference draws over 1,000 attendees interested in learning more about the latest business technologies. Many of Nebraska's community colleges also offer classes on business technologies. Opportunities for training are often more limited in rural communities. The University of Nebraska-Lincoln Extension has helped to address this gap by offering workshops on e-commerce technologies in communities across the state.

Priority Areas and Recommendations

Broadband Use in Agriculture. Internet applications relying on broadband networks are becoming increasingly important for agricultural producers as shown in the chart below.²⁸

Use of Broadband Applications by Nebraska Agricultural Producers

Internet applications relying on broadband networks are becoming increasingly important for agricultural producers.



Many smart farming technologies, including those utilizing GPS, may require a cellular connection. For example, precision guidance for row crop production requires GPS accuracy of +/- 1 inch. GPS correction through RTK (Real Time Kinematic) is often done through cellular connections. In some areas of the state, cellular coverage may be a barrier to utilizing RTK or other technologies. Anecdotal evidence suggests that some agricultural producers subscribe to two different carriers to get the coverage needed locally. Precision agriculture and remote sensing technologies produce large amounts of data. Limited upload speeds in some areas of the state may also present a barrier.

Conferences and workshops can help agricultural producers keep up to date on the latest technologies. The [Nebraska Agricultural Technology Association](#) is helping to meet this need by organizing an annual conference. In addition, University of Nebraska-Lincoln Extension Educators offer local programming on agricultural technologies. Broadband providers may also benefit from learning more about how agricultural producers are using broadband.

Priority Areas and Recommendations

Support the Development of Libraries as Community Anchor Institutions

Libraries are key partners in efforts to provide community anchor-based public access to the Internet, access to E-Government services, and training on computer applications. Often libraries are the only free access point in a community, bridging the digital divide between those that have access and those who do not. Thirty-two percent of the households in Nebraska without Internet access use the computer resources at a library or other public use facility.²⁹ Other community anchor institutions use broadband as infrastructure whereas public libraries provide broadband as a service, as well as infrastructure for increasingly bandwidth intensive applications.³⁰

Through a three-year Library Broadband Builds Nebraska Communities grant awarded to the Nebraska Library Commission in 2010, libraries in Nebraska significantly improved their capacity to provide public access to computers and the Internet. 147 library outlets serving high proportions of vulnerable and underserved populations participated in the project, receiving computers, software and other hardware, as well as broadband upgrades. The Nebraska Library Commission is partnering with the University of Nebraska-Lincoln to provide additional training for library staff on common computer applications so that they can better answer technology questions from library customers. The grant has helped library staff and customers view libraries in a new light. Libraries are growing in their capacity to serve as essential digital connectors and vibrant community hubs for people to meet, learn, grow and exchange ideas together.

The national Edge Initiative is a resource for libraries in Nebraska and across the United States to help libraries and local government work together to assess how they are using technology and the technology needs of the community. This initiative also provides resources to help libraries develop a plan to achieve community goals and better meet the technology needs of the community.

Libraries may be challenged by several factors, including:

- Insufficient technical support,
- Need for staff training on technology applications,
- Funding to replace aging computers,
- Growing demand for greater broadband speeds,
- Distance from a community's last-mile broadband infrastructure.

The NITC Community Council is working with libraries and the Nebraska Library Commission to verify the landscape of Nebraska libraries serving as community anchor institutions and to identify and highlight new models for providing technical support and advanced broadband capabilities and services.

Libraries are growing in their capacity to serve as essential digital connectors and vibrant community hubs for people to meet, learn, grow and exchange ideas together.

Priority Areas and Recommendations

Support the Use of Broadband in Education and Health Care

Technology-related development crosses all sectors in a community, including education and health care. In many communities, schools and health systems may be among the largest users of telecommunications services.

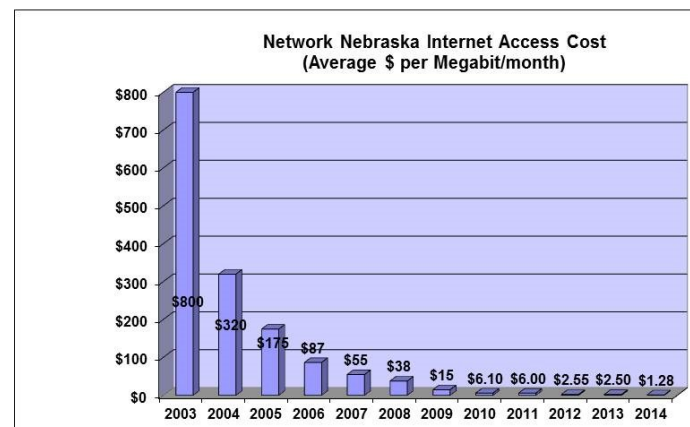
Education. The state's education network, Network Nebraska-Education, has enabled the exchange of video distance learning classes and decreased the cost of commodity Internet for participating K-12 entities. Nebraska K-20 education now enjoys one of the lowest unit costs for commodity Internet in the entire country. The deployment of 1:1 computing devices in schools and the migration to digital content and online assessments are significantly increasing broadband utilization by schools. The federal E-rate program provides discounts to assist most schools and libraries in the United States to obtain affordable telecommunications and broadband access.

Network Nebraska-Education acts as an anchor tenant by leasing facilities from telecommunications providers. As a result, investments made in the state's telecommunications infrastructure by the private sector to support Network Nebraska-Education benefit other customers as well.

Schools also play a role in providing opportunities for students to learn computer applications and coding. IT focus programs and career academies can encourage students to choose a career in IT and help students develop the necessary skills to enter the IT workforce.



Network Nebraska-Education was recognized by the National Association of State CIOs as an outstanding collaborative project in 2013. Tom Rolfes and Jayne Scofield are pictured receiving the award. The graph below shows the average Internet access cost from 2003-2014.



Health Care. Health IT is impacting the way health care is delivered and managed. Electronic health records and health information exchange are making it easier for physicians and other health care providers to have more complete patient information at the point of care. Telehealth is

The state's education network, Network Nebraska-Education, has enabled the exchange of video distance learning classes and decreased the cost of commodity Internet for participating K-12 entities.

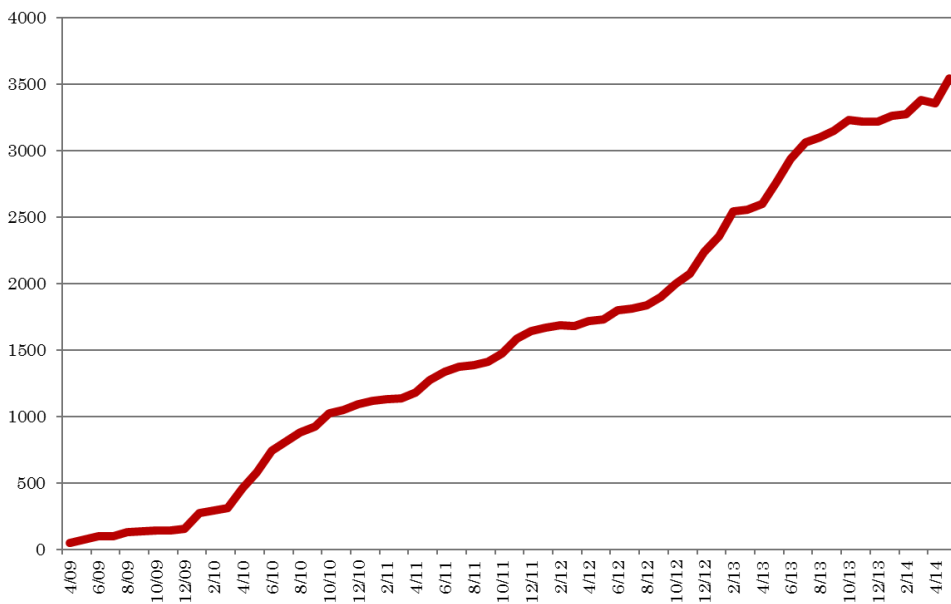
Priority Areas and Recommendations

making consultations with specialists more accessible to those living in rural Nebraska. Remote monitoring technologies are helping to reduce hospital readmissions. Patient portals, personal health records, and other applications are helping patients better manage their health care. Several of these emerging health applications will require patients and/or their care givers to have broadband access and the skills to use these applications. As these technologies mature and become more widely adopted, health IT may become broadband's next killer app.

The [Nebraska Statewide Telehealth Network](#) connects nearly all of the state's hospitals and all of the state's public health departments. The network is used for patient consultations via interactive video, teleradiology, administrative meetings and continuing medical education.

Nebraska is a leader in exchanging health information. [NeHII](#) (the Nebraska Health Information Initiative) is one of the largest statewide health information exchanges in the country. By using NeHII, a doctor in an emergency room can view a patient's medication history, avoiding an adverse drug event. A patient's primary care physician and any specialists involved in his/her care can both have access to a patient's latest lab results and medications. The following graph shows the growth in the number of NeHII users since 2009.

NeHII Virtual Health Record Users



*Health IT is
impacting the
way health care is
delivered and
managed.*

Priority Areas and Recommendations

Support the Use of Broadband by Government and Public Safety Entities

From driver's licenses to marriage licenses to pet licenses to property taxes and parking tickets, citizens and residents interact with local governments on a regular basis. Citizens expect to find information online and to complete transactions online. Local government websites also often serve as a source of more general community information for residents, visitors, and prospective residences.

Citizens expect to find information online and to complete transactions online.

Funding and the ability to accept payment by credit card are two of the major barriers to implementing e-government services by Nebraska municipalities and counties, according to 2012 surveys of members of the Nebraska Association of County Officials and Nebraska League of Municipalities.³¹

Two public safety-related initiatives—FirstNet and Next Generation 911—are also impacting first responders and public safety entities. FirstNet is a federal initiative to provide mission-critical, high-speed data services to supplement the voice capabilities of current Land Mobile Radio (LMR) networks. It will be used to send data, video, images, and text. FirstNet will also carry location information and eventually support streaming video. FirstNet also plans to offer cellular voice communications such as Voice over Long Term Evolution (VoLTE) or other alternatives. Nebraska received \$1.5 million in federal funding from the U. S. Department of Commerce National Telecommunications and Information Administration to support planning, consultation, and data collection activities.

Next Generation 911 is the next stage in developing a 911 system compatible with today's communications technologies. The Internet Protocol (IP)-based Next Generation 911 system is designed to enable dispatchers to move data including photos and video to responders without negatively impacting response time.

Priority Areas and Recommendations

Support Efforts to Attract New Residents and Retain Youth

Broadband availability and technology-related development are seen by many—especially in Nebraska’s rural areas—as key components for attracting new residents and retaining youth. Survey research conducted through the Nebraska broadband initiative supports the importance of broadband to retain and attract both youth and businesses. A survey of Nebraska businesses in the fall of 2013 found that over one-half of the businesses rated the availability of broadband Internet access as either very essential (38%) or very important (14%) in selecting their location. Furthermore, 64% of respondents said broadband is essential for remaining in their current location. A survey of Northeast Nebraska high school students in the spring of 2012 indicated that the lack of broadband capacity and speed could inhibit this population from staying or returning to the region. Over one-half (57%) of Northeast Nebraska high school students who answered the online survey reported that having broadband in their community would help entice them to live and work here.

Strategies to attract new residents and retain youth include:

- Recruiting technology companies. Xpansion has rural sourcing locations in Kearney and Loup City and Phynd Technologies recently located in Kearney.
- Attracting lone eagles and telecommuters who can work anywhere remotely.
- Helping local businesses increase revenue and create jobs by utilizing broadband technologies.
- Facilitating recruitment by developing an effective web and social media presence which highlights available jobs and provides community information
- Supporting the development of new businesses.
- Making the community more welcoming and attractive to new residents and youth.

Broadband availability and technology-related development are seen by many—especially in Nebraska’s rural areas—as key components for attracting new residents and retaining youth.

Priority Areas and Recommendations

Increase Digital Literacy and Broadband Access to the Internet

Technology-related development requires widespread adoption of broadband technologies. Most households in Nebraska (82%) have broadband access to the Internet, according to a 2014 survey of Nebraska households. However, there are significant rural-urban differences in broadband adoption. Ninety percent of households in the Lincoln area and 87% of households in the Omaha have broadband access to the Internet. In comparison, the percentage of households with broadband access to the Internet in other regions of the state ranges from 72% to 77%.³²

Older adults, those with lower incomes and those with lower levels of income are also less likely to have broadband access to the Internet at home as shown in the graph below.

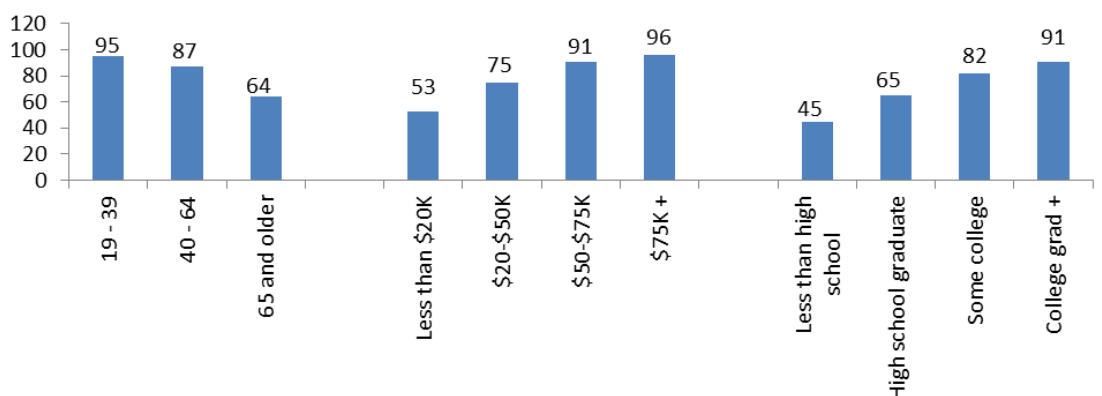
Public libraries and other organizations play a vital role in providing public access to computers and the Internet. Access to the Internet and a computer has now become necessary for a whole range of activities from applying for jobs to downloading tax forms. Public libraries also often provide much-needed training to those new to computers and those who want to update their skills. Innovative partnerships between libraries, community colleges, and other entities can also help small businesses whose employees need training on basic computer applications. Additionally, some telecommunications providers offer low-cost broadband service and free training to low-income consumers.

Broadband Access to the Internet at Home	2014
Nebraska Households with Broadband Access to the Internet at Home	82%
By Region	
Lincoln Area	90%
Omaha Area	87%
Southeast	77%
South Central	76%
West Central	74%
Panhandle	73%
Central	73%
Northeast	72%

*For the survey, broadband was defined as anything faster than dial-up.

Technology-related development requires widespread adoption of broadband technologies.

Broadband Service by Demographic Factors, 2014



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Nebraska Broadband Initiative

The Nebraska Broadband Initiative (broadband.nebraska.gov) promotes the adoption and utilization of broadband in Nebraska. Project partners include the Nebraska Public Service Commission, University of Nebraska-Lincoln, Nebraska Information Technology Commission, Nebraska Department of Economic Development, and AIM. Activities include the development of a state broadband map (broadbandmap.nebraska.gov), state broadband conferences, videos highlighting how broadband is being used in Nebraska communities, surveys of households and businesses, regional broadband plans, community planning materials, and these recommendations.

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Broadband Goals Update

September 2018

In December 2014, the NITC, in partnership with the Nebraska Broadband Initiative, published a state broadband plan. *Broadband in Nebraska: Current Landscape and Recommendations* described existing broadband policies and programs and identified recommendations based on feedback from stakeholders across the state. While the plan addressed the need to invest in Nebraska's telecommunications infrastructure, much of the plan focused on encouraging the use of broadband technologies. The plan was completed as part of the broadband planning and mapping grant from the NTIA awarded to the Nebraska Public Service Commission.

The report included the following recommendations:

- Encourage investment in Nebraska's telecommunications infrastructure.

 - Provide support through the Nebraska Universal Service Fund.

 - Aggregate demand and act as an anchor tenant.

 - Explore Ways to Leverage FirstNet and Next Generation 911 investments.

- Enhance the capacity of local communities to address broadband development.

- Encourage the development of a skilled IT workforce.

- Support innovation and entrepreneurship.

- Support the use of broadband technologies in businesses and agriculture.

- Support the development of libraries as community anchor institutions.

- Support the use of broadband in education and health care.








- Support the use of broadband by government and public safety entities.

- Support efforts to attract new residents and retain youth.

- Increase digital literacy and broadband access to the Internet.

The report also included several goals. The following page includes information on our progress in meeting those targets.

Nebraska Broadband Goals Update 2018

Measure	Baseline	Most Recent	2020 Target	On Track
Subscription to broadband service by households in Nebraska ⁸	82% (2014, <i>University of Nebraska Survey</i>)	85% of adults have internet access. 65% have fixed connections. Another 20% are mobile-only. (2018, <i>Pew Internet, 2018</i>)	Over 90%	
Subscription to broadband service by households in nonmetropolitan Nebraska	73.6% (2014, <i>University of Nebraska Survey</i>)	84% Another 7% had only a cell phone data plan (2018 <i>Rural Poll- University of Nebraska</i>)	85%	
% of households with broadband service of at least 25 Mbps down available	74.9% (Dec. 2013 <i>Form 477 data, broadband-map.gov</i>)	88.9% 2016, FCC Broadband Deployment Report June 2017 data was released on Sept. 10, 2018. Nebraska was one of 13 states that saw a decrease in % population with broadband available. We are still looking into the data to understand what is behind this decrease.	90%	 
% of households with broadband service of 1 gbps down available	11.5% (Dec. 2013 <i>Form 477 data, broadband-map.gov</i>)	17% at 1 gbps 71% at 100 Mbps/10 Mbps (FCC Broadband Map, 2016 data)	25%	
Degrees awarded in computer and information science, by Nebraska colleges and universities ¹⁰	1,113 (2012, <i>National Center for Education Statistics</i>)	1,128 (2015-2016, <i>National Center for Education Statistics</i>)	1,400	
% of computer and information science, engineering, and engineering technologies degrees awarded to women by Nebraska colleges and universities	20% (2012, <i>National Center for Education Statistics</i>)	22.8% (2015-2016, <i>National Center for Education Statistics</i>)	At least 25%	





Broadband in Nebraska

Current Landscape and Recommendations

2014

