

# LEVERAGING BROADBAND IN YOUR COMMUNITY

*A Workbook to Help Communities Stimulate Broadband Development*



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Stimulate Broadband Development*



## 2014 NEBRASKA BROADBAND INITIATIVE

NEBRASKA PUBLIC SERVICE COMMISSION  
 UNIVERSITY OF NEBRASKA-LINCOLN  
 NITC COMMUNITY COUNCIL  
 NEBRASKA DEPARTMENT OF ECONOMIC DEVELOPMENT  
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[The Nebraska Broadband Initiative](#) 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](#), 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.

This Broadband Mapping and Planning Initiative aims to increase broadband adoption and utilization. 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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## Part 1

# IS YOUR COMMUNITY LEVERAGING BROADBAND?

Communities—large and small—are leveraging broadband to create jobs, improve access to education and health care, and improve quality of life.

This workbook can help your Communities—large and small—are leveraging broadband to create jobs, improve access to education and health care, and improve quality of life. This workbook can help your community assess how broadband is currently being utilized and to identify ways in which broadband can enhance develop opportunities.



Bob Kerrey Pedestrian Bridge  
Omaha, NE

## WHAT IS BROADBAND?

The term broadband commonly refers to high-speed Internet access. 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.” 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

## HOW IS TECHNOLOGY IMPACTING MY COMMUNITY?

Here is a list of ten technology trends impacting communities:

1	Social media is changing how we communicate
2	Broadband has gone mobile
3	Online video is huge
4	Services are moving online, making public access critical
5	Location-based services know where you are
6	Cloud computing is changing service models
7	IT workers are in high demand
8	Health applications will be the next killer app
9	Tablets and e-readers are growing in popularity
10	Technology is facilitating collaboration

Learn more about these [technology trends](#).

## HOW CAN BROADBAND HELP MY COMMUNITY?

Broadband has become as essential as electricity for many businesses. Here are ten ways broadband helps rural communities:

1	Links local businesses to global markets
2	Allows consumers to tap into e-commerce savings
3	Expands access to educational opportunities
4	Increases local job growth
5	Connects patients to world class healthcare and reduces care costs
6	Enhances economic options for younger generations
7	Provides new tools to farmers and ranchers to grow their businesses
8	Enables entrepreneurs to locate their businesses locally
9	Attracts customers to local businesses
10	Offers families low cost options to stay in touch using the latest technology

Source: [Internet Innovation Alliance](#)



## HOW CAN MY COMMUNITY ADDRESS BROADBAND DEVELOPMENT?



Broadband 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.

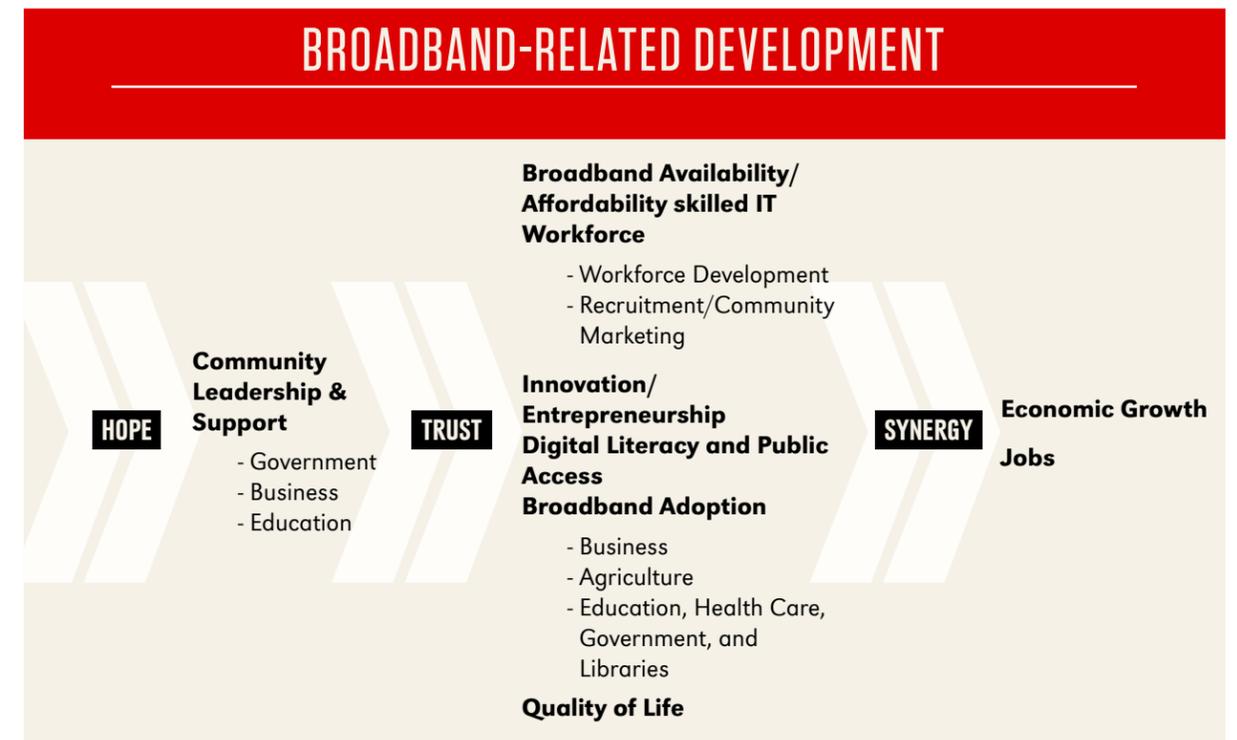
A sense of hope for a better future helps sustain initial efforts. Collaborating on small projects

builds trust and social capital. Community partners then work together on bigger projects which address:

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

This can lead to economic growth and job creation.

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



## SIX SIMPLE WAYS TO ADDRESS BROADBAND DEVELOPMENT

- 1 Organize monthly lunch and learn and/or evening sessions on new technologies
- 2 Work with the local library to offer additional classes on new technologies
- 3 Organize a technology week. Activities could include:
  - a. Demos of 3D printers, Google Glass or other technologies
  - b. Lunch and learn sessions
  - c. Tours to see how local businesses are using technology
- 4 Work with health care providers to schedule sessions on health care apps. (This could be part of a lunch and learn series or a standalone session)
- 5 Form local user groups for popular devices to share new apps and provide support to new users
- 6 Explore ways to encourage youth to learn coding and pursue careers in IT

The following sections provide additional information on each of the elements of technology-related development.

[Part 2](#) provides resources to help communities develop plans to address technology-related

development. Although all of these areas are important, it may be overwhelming to address all areas at once. Many communities focus on three or four areas.

## COMMUNITY LEADERSHIP, SUPPORT AND ADVOCACY



*Are community leaders aware of the importance of information technology and do they work together to address the broadband and technology needs of the community?*

*Are government, businesses, and educational entities working together to address broadband development?*

Broadband-related development starts with community leadership. Forming a community technology committee with representatives of key sectors and institutions in a community, including local government, economic and community development organizations, business, the library, education, and health care is often the first step to leveraging broadband-related development.

### HEAR HOW COMMUNITIES ARE LEARNING ABOUT BROADBAND AND BUILDING SUPPORT



[Nate Wyatt from Gothenburg State Bank discusses the importance of broadband to communities.](#)



[Nate Wyatt shares how Gothenburg began educating the community and getting leaders on board.](#)



[View the panel conversation on broadband availability and affordability from the 2014 Connecting Broadband Nebraska conference.](#)

## BROADBAND AVAILABILITY AND AFFORDABILITY

### IS BROADBAND SERVICE AVAILABLE TO ALL BUSINESSES, ORGANIZATIONS, AND RESIDENTS?

*Does your community have affordable access to broadband service?*

*Does your community have adequate mobile broadband coverage?*

Broadband service is available to nearly all Nebraskans, with 99.5% of Nebraskans having access to service of at least 10 Mbps down. Nebraska ties for 12th on this measure according to the federal broadband map ([broadbandmap.gov](#))<sup>1</sup>.

### WHAT ABOUT GIGABIT INTERNET?

At 1 billion “bits per second,” a gigabit is 200 times faster than today’s U.S. average of roughly 5 million bits per second (5 Mbps). Several communities in Nebraska now have Gigabit Internet, and the list is growing. Just over 10% of Nebraska households have Gigabit Internet available.

Applications which will take advantage of the capabilities of Gigabit Internet are still largely in development. In the future, however, Gigabit Internet will be increasingly important to the economic vitality of communities.

### WHY IS UPLOAD SPEED IMPORTANT?

Upload speeds may be a bigger issue than download speeds for some businesses. Many broadband plans provide higher download speeds and significantly lower upload speeds. Businesses which rely on information technology often generate large amounts of data.

Transmitting this data or storing it in the cloud may require a greater upload speed than what is typically offered in a standard broadband package. Broadband services provided over fiber usually offer higher upload services.

### WHAT ABOUT SATELLITE SERVICE?

Satellite service may be the only option for some households and businesses in very rural areas. ViaSat/Exede launched a new satellite in 2011 and began providing improved satellite service in parts of the eastern United States. Another satellite is expected to be launched in 2016 and will provide service to Nebraska and the western portion of the United States. The improved satellite service provides a 12 Mbps downstream/3 Mbps upstream service. The new service also offers improved latency.

A recent test by the FCC documented the latency at 671 ms, significantly less than the latency offered by older satellite technologies but still far above the average latencies of fiber to the premise (24 ms), cable (30 ms) or DSL (48 ms) providers. Exede’s website says that the service can be used for VOIP, but may not work well for VPN connections or logging in remotely to remote servers.

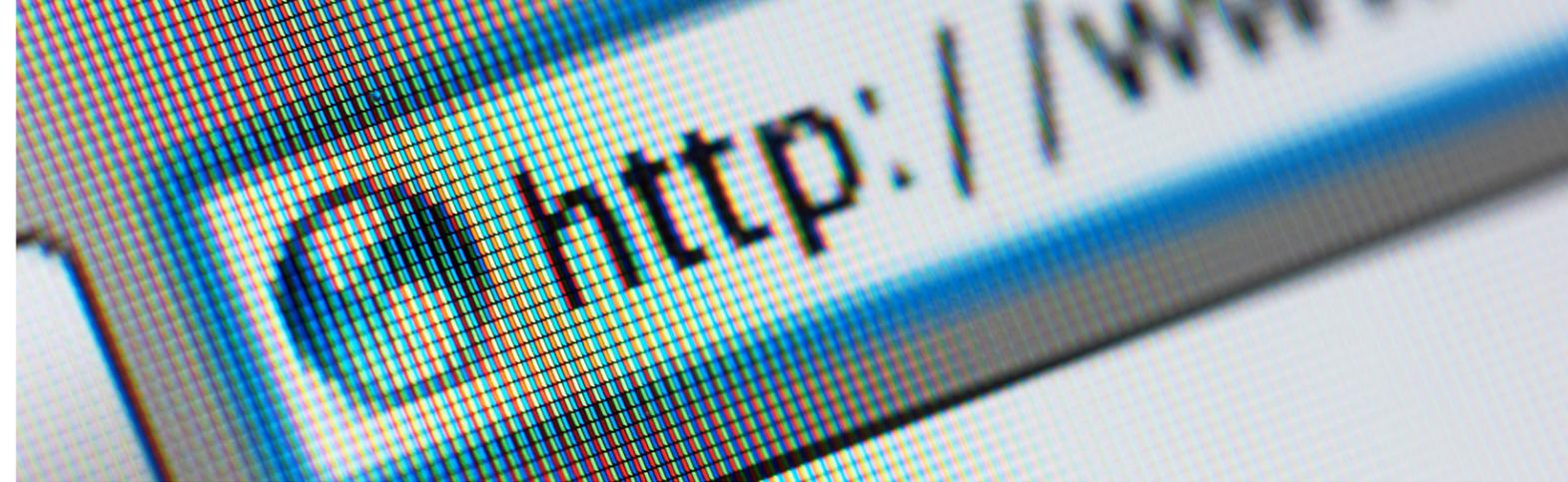
Sources:

[FCC. 2014 Measuring Broadband America Fixed Broadband Report. \(June 2014\)](#)

[USwitch Download Calculator](#)

[Exede](#)

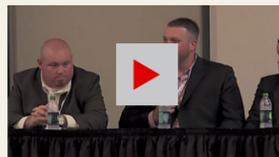
<sup>1</sup> [National Broadband Map](#) accessed August 1, 2014. Data from Dec. 31, 2013.



Communities can address broadband availability and affordability in two ways. First, communities can host training sessions and educational opportunities to help businesses and residents better understand broadband and how it can be used. These activities help build demand for broadband services. Secondly, communities can work with telecommunications

providers to help ensure that current and future broadband needs are met. Forming a committee to address broadband development is often the first step. Next steps may include holding a public forum and/or documenting the demand for broadband services through a community survey.

## LEARN HOW NEBRASKA COMMUNITIES AND BUSINESSES ARE WORKING WITH TELECOMMUNICATIONS COMPANIES



*[Nate Wyatt from Gothenburg State Bank describes how the community of Gothenburg learned to work with telecommunications providers.](#)*



*[Troy Stickels from Glenwood Telecommunications talks about how a business owner decided to route a fiber line to benefit other businesses in the community.](#)*

## STEPS YOU CAN TAKE IF YOU WANT BETTER BROADBAND SERVICE

- Talk to your current provider to see if you can upgrade your service.
- Go to the [Nebraska Broadband Map](#) to see if there are other providers in your area who may be better able to provide service.
- If a telecommunications company is providing broadband service in an adjacent local exchange area, an individual may file an application with the [Nebraska Public Service Commission](#), 402-471-3101 or toll free 1-800-526-0017 to obtain broadband service from the telecommunications company serving the adjacent exchange area. See Nebraska Revised Statutes 86-135 to 86-138 for more information on the process.
- Find allies. Identify others in your area who are also interested in obtaining better broadband service. Working as a group can be more effective than working alone.
- Work with other interested community leaders, individuals and businesses in your area to form a community broadband committee. Ideally, the committee should include representatives from local government, economic development, businesses (including agricultural producers), schools and libraries, health care providers, and local telecommunications providers.

Here is a list of activities committees may wish to undertake:

- Invite representatives of local government, health care systems, and schools to meet periodically to discuss any planned improvements in telecommunications infrastructure and ways in which costs could be shared.
- Hold a forum to discuss the broadband needs of the community and involve interested stakeholders. Extend invitations to local telecommunications providers and officials.
- Develop a broadband plan to address issues identified during the community forum and by the broadband committee.
- Help community members stay up to date on new technology by hosting classes, lunch and learn sessions, etc. These kinds of activities help build demand for broadband service.
- Invite representatives of local government, health care systems, and schools to meet periodically to discuss any planned improvements in telecommunications infrastructure and ways in which costs could be shared.
- Identify businesses, community anchor institutions (i.e., local government, schools, health care facilities) and residences interested in better broadband service and the level of service needed through a survey or other method. Use this information to present a business case for investing in your community to telecommunications providers.

## LEARN MORE ABOUT BROADBAND AND THE BROADBAND MAP



*[Broadband Terms. Gene Hand from the Nebraska Public Service Commission explains many commonly used broadband terms.](#)*

*Definitions for many terms are included in the [glossary](#).*



*[Broadband Map. Watch a demo of the Nebraska Broadband Map given by Cullen Robbins with the Nebraska](#)*



*Is there an adequate IT workforce to meet the demands of local businesses?*

*Are there opportunities for advanced information technology training through local high schools, colleges and universities, or other institutions?*

*Are technology programs for youth offered in local schools or by other organizations?*

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.

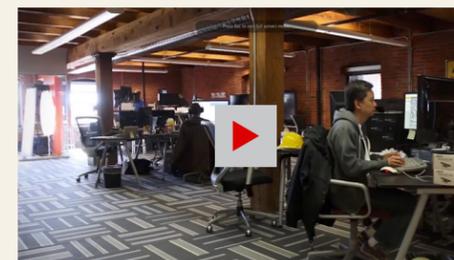
Businesses outside of Omaha and Lincoln may find it even harder to recruit IT employees.

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. However, there are several innovative programs, including both in school and after school programs, which are introducing students to coding. There are also a number of resources available including materials from the Khan Academy and MIT's Scratch program which can be used to teach coding to students.

Finding employees with good basic technology skills or helping existing employees learn new technologies can also be a challenge for businesses.

## 1ST JOB LINCOLN CONNECTS HIGH SCHOOL STUDENTS WITH BUSINESSES

[1st Job Lincoln](#) will be starting its second year in Lincoln. The program is a partnership of Lincoln Human Resource Management Association, the AIM Institute, and Lincoln Public Schools' IT focus program to provide IT-based internships for high school students. Through the pilot program, 15 high school students in the summer of 2013 experienced their first professional job. The program included workforce readiness preparation.



[Hear from Champion Employers participating in 1st Job Lincoln](#)



[Hear from 1st Job Lincoln student interns](#)

## RESOURCES FOR LEARNING OR TEACHING CODING

[Code Academy](#) sponsors the annual Hour of Code event to encourage young people to try coding and provides free, interactive lessons on coding.

[CoderDojos](#) are a global movement of open source coding sessions led by volunteer mentors from education and industry. Kids learn how to creatively code at their own pace in a fun, relaxed environment. CoderDojos are free to attend. AIM has hosted CoderDojos in Omaha, Lincoln, and Kearney.

[Khan Academy](#) (Requires registration) provides a video introducing programming and tutorials on drawing using JavaScript.



*A mentor works with young people at the April 26, 2014 CoderDojo in Lincoln.*

[Scratch](#) is a free, online resource developed by the Lifelong Kindergarten Group at the MIT Media Lab which enables children to program interactive stories, games and animations.

[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.

[Girls Who Code](#) aims to provide computer science education and exposure to 1 million young women by 2020. The organization partners with school networks, community-based organizations, libraries, technology companies to bring Girls Who Code Clubs to communities all across the country.

[Made with Code](#) is an initiative led by Google to engage girls in coding. Partners include Girls Inc., Girl Scouts of the USA, National Center for Women and Information Technology, MIT Media Lab, TechCrunch, and Seventeen. Made with Code includes:

- Blockly-based coding projects like designing a bracelet 3D printed by Shapeways, learning to create animated GIFs or building beats for a music track.
- Video profiles of girls and women who explain how they're using code to do what they love – in fashion, music, dance, animation, cancer research and more.
- A resource directory for parents and girls to find more information about new local events, camps, classes and clubs.

- Collaborations with organizations like Girl Scouts of the USA and Girls, Inc. to introduce Made with Code to girls in their networks, encouraging them to complete their first coding experience.
- [Sew Electric](#) offers a collection of do it yourself projects that combine fabric, electronics, and programming.

[SMART Girls Club](#) engages girls in science, technology, engineering and math. The YWCA in Lincoln sponsors several clubs at Lincoln elementary and middle schools.

[Code Day Omaha](#) is a 24-hour coding event for students. The 2014 Code Day Omaha is hosted at the Omaha Code School. The world-wide event is coordinated by [StudentRND](#).

[4-H Science, Engineering, and Technology](#) includes projects, college major information, and career information on aerospace, computers, electricity, GEAR-TECH-21, geospatial, physics, robotics, small engines, welding, and woodworking.

*Jason Patrick Ross / Shutterstock.com*



The Great Platte River Road Archway  
Kearney, NE

## INNOVATION AND ENTREPRENEURSHIP

*Does your community/region support entrepreneurship and innovation through business incubation facilities, meet ups for entrepreneurs, coworking facilities, maker spaces/clubs, or other programs for start-ups?*

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.



[Listen to David Graff Discuss Hudl's Growth and the Supportive Environment for Entrepreneurs in Nebraska.](#)

## 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.

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

## LEARN MORE ABOUT MAKER SPACES



[Shane Farritor from the University of Nebraska-Lincoln explains maker spaces and the importance of building a culture of collaboration and creativity.](#)

## TECHNOLOGY ADOPTION—DIGITAL LITERACY AND PUBLIC ACCESS

Do most households subscribe to broadband service?

Does the local library offer access to computers and the Internet and free or affordable training on basic computer and Internet skills?

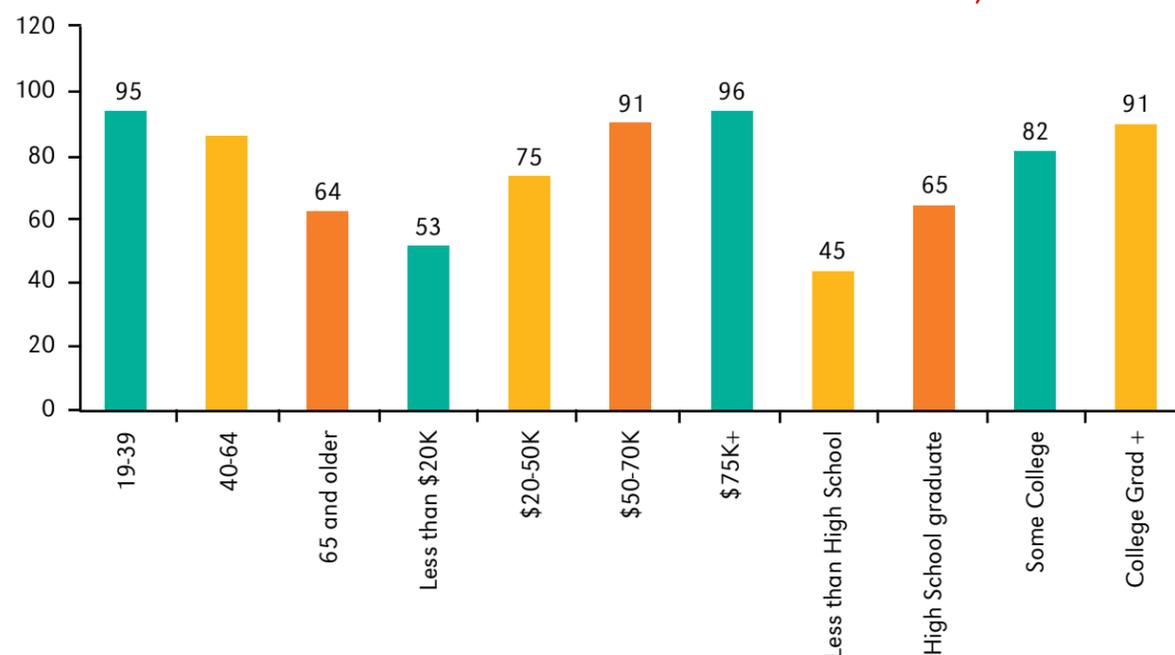
Technology-related development requires widespread adoption of broadband technologies. Most households in Nebraska (82%) have broadband service, according to a [2014 survey of Nebraska households](#). However, there are significant rural-urban differences in broadband adoption. Ninety percent of households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

BROADBAND SERVICE AT HOME	2014
Nebraska Households with Broadband Service 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.

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

### BROADBAND SERVICE BY DEMOGRAPHIC FACTORS, 2014



Public libraries and other organizations play a vital role in providing public access to computers and broadband. Access to broadband 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.

## TECHNOLOGY ADOPTION—BUSINESSES

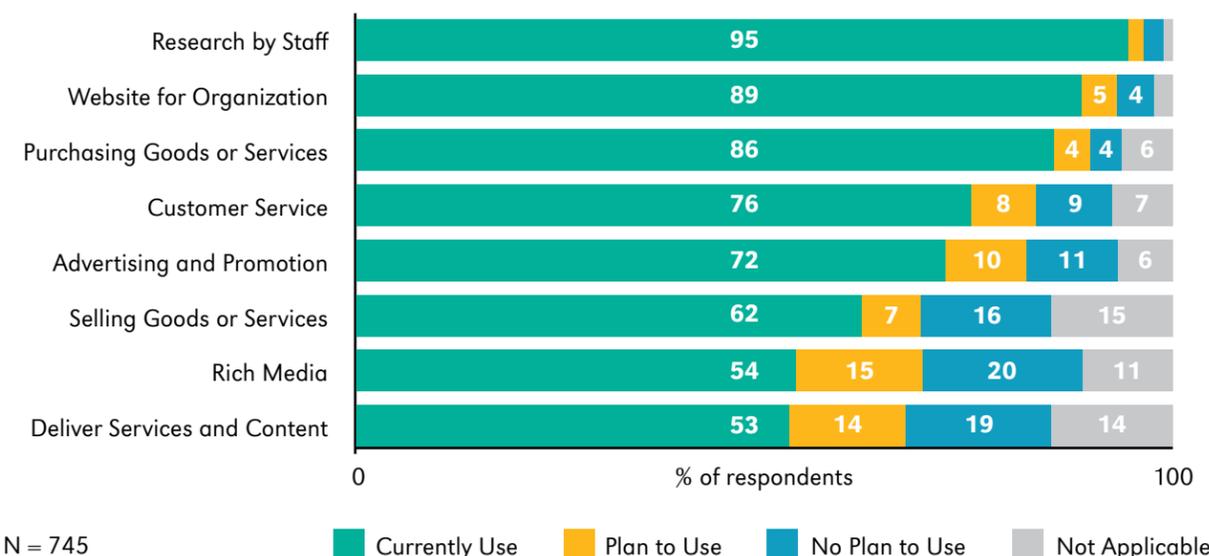
Are local businesses effectively utilizing broadband?

From Comfy Feet in Hartington to Dinklage Feed Yards in Sidney, 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 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.

How are businesses in Nebraska using broadband?

- Over 85 percent of businesses use the Internet to purchase goods and services online. In contrast, 61.9 percent of organizations sell goods and services online and 53.2 percent deliver services and content online.
- Broadband can transform how organizations conduct their operations. Over 80 percent of organizations use broadband for coordination with suppliers, while over 78 percent use broadband for employee training and another 75.6 percent for improving customer service.

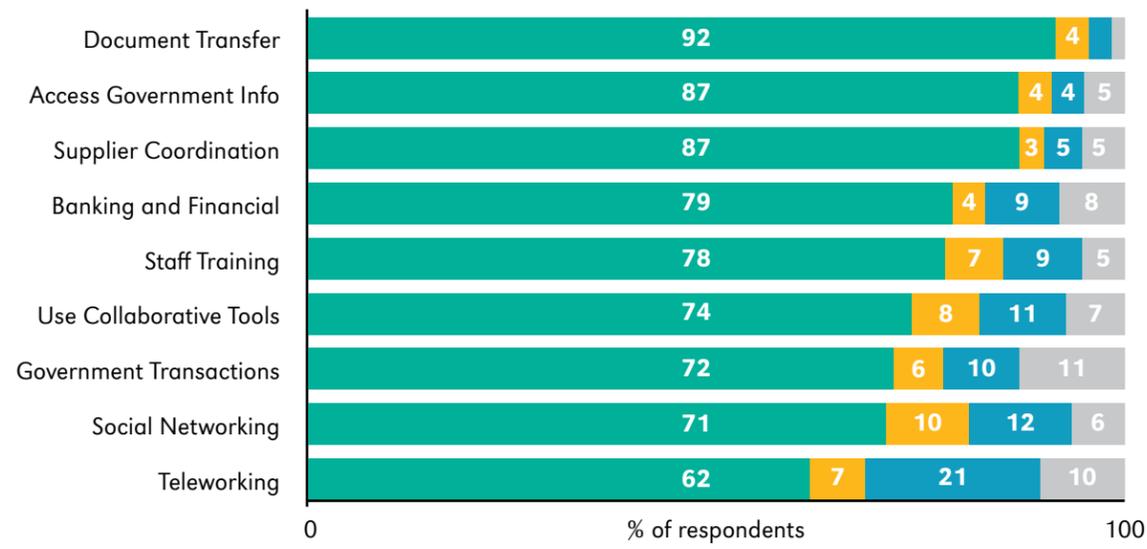
### E-COMMERCE USES OF BROADBAND



N = 745

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

## E-PROCESS USES OF BROADBAND



N = 745

■ Currently Use
 ■ Plan to Use
 ■ No Plan to Use
 ■ Not Applicable

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

## LEARN HOW NEBRASKA BUSINESSES ARE USING BROADBAND



**[MetalQuest in Hebron, Nebraska](#)**—Global markets find MetalQuest for precision manufacturing. Broadband makes this operation world-class, competitive – and successful.



**[Comfy Feet in Hartington, Nebraska](#)**—This small town company meets customer requests worldwide. Broadband access makes promotions, jobs and sales possible for Comfy Feet.



**[Bassett Livestock in Bassett, Nebraska](#)**—Bassett Livestock brings cattle auctions from rural Nebraska to bidders and buyers nationwide.



**[Fred Lockwood and Company CPA in Chadron, Nebraska](#)**—Broadband access adds up to positive impacts for these accounting offices. They connect – and succeed – with customers and employees to save time and money.



**[Country Drawers in Cambridge, Nebraska](#)**—Eco-friendly operations are in place from every angle for Country Drawers. Natural and organic products are promoted, managed and sold internationally with online connections and capabilities.



**[Roe Buick in Grand Island, Nebraska](#)**—The car shopping and maintenance experience is upgraded at Roe Buick. Car shoppers can view inventory, schedule appointments and ask questions online.



**[Agilx in Lincoln, Nebraska](#)**—Custom software and solutions are available anywhere. Lincoln goes global for Agilx customers though broadband.



**[C & C Processing near Diller, Nebraska](#)**—C & C Processing offers traditional high quality meat products online to shoppers anywhere in the country.



**[Assurity Life in Lincoln, Nebraska](#)**—In their new building or across the country, Assurity uses broadband to manage life insurance data for their tremendous customer base.

## TECHNOLOGY ADOPTION—AGRICULTURE

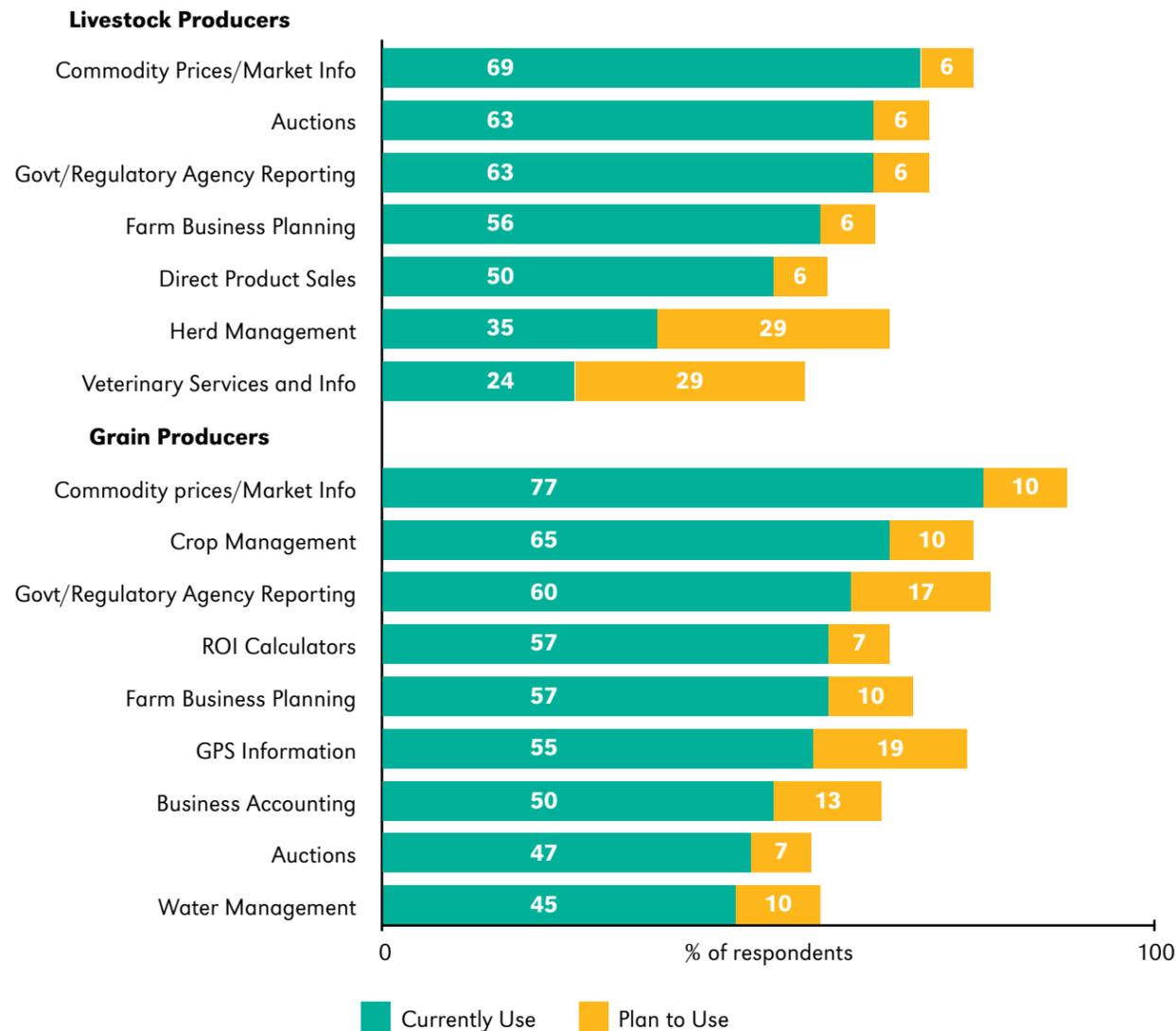
Are agricultural producers and agribusinesses effectively utilizing broadband?

Broadband applications are becoming increasingly important for agricultural producers. A [2013 survey of Nebraska agricultural producers](#) found that over 60% of livestock producers are using broadband for commodity prices/market information (69%), government/regulatory agency reporting (63%), and auctions (63%). Herd management and

veterinary services are expected growth areas with 29% of livestock producers planning to use these applications in the future.

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%). The two applications with the greatest expected growth are GPS information and government/regulatory agency reporting.

## USE OF BROADBAND APPLICATIONS BY NEBRASKA AGRICULTURAL PRODUCERS



Source: [Nebraska Broadband eSolutions Benchmarking Report](#) and [Technology Use in Agriculture Cornhusker Economics](#)

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 accuracy. 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. 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.

## LEARN HOW NEBRASKA AG PRODUCERS AND AGRIBUSINESSES ARE USING BROADBAND



[Dinklage Feed Yards in Sidney, Nebraska—They bring high tech tools to traditional livestock operations. Dinklage Feed Yards use high speed Internet in all areas of monitoring, feeding and health care for their cattle.](#)



[Miletta Vista Winery near St. Paul, Nebraska—The view is awesome; the wine is wonderful. With a new broadband connection, Miletta Vista Winery keeps high tech operations moving and customers wanting another glass.](#)



[21st Century Equipment in Bridgeport, Nebraska—Miles don't matter for this equipment dealer. Broadband lets dealerships and customers in three states share information immediately.](#)

## TECHNOLOGY ADOPTION—EDUCATION

*Do local schools use technology to enhance educational opportunities and communication with families?*

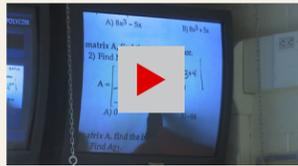
Schools are among the heaviest users of broadband, using broadband for distance education, content management systems to support classroom learning, web-based systems that let parents check grades or lunch balances, online assessments, and/or using web-based systems to schedule parent teacher conferences. 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. 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.

## LEARN HOW NEBRASKA SCHOOLS ARE USING BROADBAND



*[Lincoln Public Schools Distance Learning in Lincoln, Nebraska—The Lincoln Public Schools IT Focus Program Teacher Steve Carr describes the benefits of distance education.](#)*



*[Nancy Olsen uses Broadband in Education—Nancy Olsen, Banner County Public Schools, uses broadband in her classroom to teach virtually and to partner with other schools.](#)*

## TECHNOLOGY ADOPTION—HEALTH CARE

*Do local hospitals and health care providers use technology to improve patient 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. Remote monitoring technologies are helping to reduce hospital readmissions. Patient portals, personal health records, and other applications are making it easier for patients to better manage their health care. Telehealth is making consultations with specialists more accessible to those living in rural Nebraska.

The bandwidth requirements for many health IT applications are similar to common business applications. However, transferring radiological images requires significant bandwidth (100 Mbps or more), making health systems one of the biggest users of broadband in many communities.

### 10 BENEFITS OF HEALTH IT

1	Enables more informed decision-making and enhanced quality of care
2	Saves lives through remote consultations, whether urgent or diagnostic
3	Creates more efficient, convenient and potentially more cost-effective delivery of care
4	Facilitates earlier—and more accurate—diagnoses
5	Provides greater, and faster, access to a patient's medical history, reducing the risk of negative drug interactions or poor response to a course of treatment
6	Improves administrative efficiency and coordination
7	Allows rural residents to receive expert diagnosis and treatment from distant medical centers
8	Increases timeliness of treatment and decreases transfer rates, while reducing medical costs through video technology
9	Supports real-time treatment by first responders through the use of wireless devices
10	Enhances senior wellness and preventative care through telemedicine and remote-in home monitoring

Source: [Internet Innovation Alliance](#)



[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 so health care providers have more complete patient information at the point of care. [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.

Health IT is also making it easier for patients and care givers to be more informed and active participants in health care. Several of the emerging health applications will require patients and/or their care givers to have broadband access and the skills to use these applications.

## LEARN HOW BROADBAND IS BEING USED IN HEALTH CARE



*[Pioneer Memorial Rest Home in Mullen](#)—The Pioneer Memorial Rest Home in Mullen, Nebraska, is using broadband for telehealth consultations with medical specialists using interactive video.*



*[Nebraska Health Information Initiative](#)—All your medical records are available in one place – even if you are moving around. Nebraska Health Information Initiative coordinates consolidated patient medical history for doctors, providers and patients.*



*Dale Gibbs from CHI Health Good Samaritan Health discusses how broadband is impacting health care and the importance of broadband to the home.*

## TECHNOLOGY ADOPTION—LOCAL GOVERNMENT

*Are local governments using technology to communicate with citizens, to provide information, and to provide services?*

*Does your community have a well-designed website which provides information for both prospective and current residents?*

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

- 46% of municipal officials and 25% of county officials indicated that the ability to accept payment by credit card was a large challenge.
- 39% of municipal officials and 41% of county officials indicated that funding to implement e-government services was a large challenge.
- Other barriers identified include having staff available for e-government projects and keeping up with new technology.



Douglas County Courthouse  
Omaha, NE

## LOCAL E-GOVERNMENT BEST PRACTICES

### LOCAL GOVERNMENT WEBSITES SHOULD:

- Provide contact information for elected officials
- Provide contact information for local government departments
- Provide other information about local government operations and finances
- Provide information about the services they provide
- Allow individuals to download application forms for services or submit applications forms for services online
- Include links to other websites that provide useful information to individuals
- Include one or more navigations tool
- Have accessibility features
- Group related information and services on their websites, including in multiple ways when possible

### LOCAL GOVERNMENTS SHOULD CONSIDER WHETHER IT IS COST EFFECTIVE TO:

- Enable websites to be easily viewed by individuals using mobile devices
- Offer mobile applications designed for multiple operating systems commonly used by mobile devices
- Accept online payment for services.

### LOCAL GOVERNMENT SHOULD MAKE EFFORTS TO IMPROVE THEIR WEBSITES BY:

- Using website traffic statistics to analyze how their websites are used and could be improved
- Soliciting comments and feedback about their websites and then acting on the information received

### LOCAL GOVERNMENTS SHOULD ADDRESS PRIVACY AND SECURITY BY:

- Implementing effective information technology security policies and procedures
- Training staff on information technology security policies and procedures
- Accessing free or low-cost resources for improving information technology security
- Establishing privacy policies that specify how they will collect and use personal information provided by individuals
- Posting established privacy policies on their websites

Local governments should consider using social media to communicate information to the public. If social media is being used, local governments should develop policies and procedures that specify staff responsibilities for maintaining social media accounts.

Source: [State of Wisconsin Legislative Audit Bureau](#)

## TECHNOLOGY ADOPTION—LIBRARIES

Libraries are a key partner in efforts to provide public access to computers and broadband and to provide access to training. Most Nebraska households (77%) have access to a local place, such as a library or school, in their neighborhood or community where they can use an Internet-accessible computer for free, according to a [2014 survey of Nebraska households](#). Thirty-two percent of the households without Internet access use the computer resources at the public use facility.

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. 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. The Nebraska Library Commission has partnered 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. Libraries in Nebraska also have the opportunity to participate in the Edge Initiative. The program helps libraries and local government work together to assess how they are using technology and 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.



### LEARN HOW NEBRASKA LIBRARIES ARE USING BROADBAND



[Oakland Public Library in Oakland, Nebraska—It's not just about books anymore. The Oakland Public Library connects the area with information and free onsite access for their guests.](#)

## QUALITY OF LIFE, RETAINING YOUTH, AND ATTRACTING NEW RESIDENTS

*Does your community pay careful attention to quality of life issues? A high quality of life is essential to attract and retain new residents, workers and businesses.*

*Broadband availability may impact quality of life. Is your broadband adequate for future generations and businesses?*

*Does your community have marketing strategies to attract new community members?*

*Does your community have strategies to retain community members by helping them feel like they belong?*

*Is your community addressing sustainability through renewable energy or other projects?*

With an increasingly mobile population, communities need to offer a high quality of life in order to attract and retain population. For many individuals—especially young adults and professionals—broadband is an important requirement in choosing a community.

### FACTORS PEOPLE CONSIDER WHEN CHOOSING A COMMUNITY

[Community marketing research](#) has found that factors people consider when they are choosing a new community include:

- Safety
- Proximity to Relatives
- Open Spaces
- Slower Pace of Life
- Lower Cost of Living
- Quality of Education
- Recreation
- Health Care
- Opportunity to Make Living

### RETENTION STRATEGIES ARE IMPORTANT

[Research](#) shows that residents can be successfully recruited. However, new residents may be difficult to retain. Meeting new community members, learning about their individual skills and interests, and introducing them to those who share those interests or require those skills can help newcomers “fit in”.

## USING IMAGES TO MARKET YOUR COMMUNITY

[People relate to community images.](#)

They can be very important in developing the viewer’s first impression of a community.

Images should show:

- People participating in activities and using community amenities
- A diversity of employment opportunities (agriculture, blue collar, professional, health care, etc.)
- Available services, health care, schools
- A range of available housing options
- Examples of multigenerational and intergenerational interaction
- The local flavor, landscape and surrounding area of the community
- Everyday activities like grocery shopping, children walking to parks, dads mowing the yard
- A mix of age, gender, and ethnic diversity
- A realistic view of what it is like to live in the community



## LEARN MORE ABOUT BROADBAND, RECRUITMENT AND RETENTION



[Ryan Mead, CEO/Founder, Vitru Inc., explains importance of broadband and quality of life.](#)

[\(Video - broadband session - 16:56 - 17:30\)](#)

[The Marketing Hometown America study guide](#) can help your community learn what new residents are looking for as they relocate to a rural community, discover often overlooked local assets that can attract potential new residents

and develop & implement marketing plans and community improvement projects.

This [video](#) provides an overview of the guide. Learn about strategies to attract and retain workers in a changing economy at the [Community Marketing site](#).

## Part 2

# ADDRESSING BROADBAND DEVELOPMENT IN YOUR COMMUNITY

With an increasingly mobile population, communities need to offer a high quality of life in order to attract and retain population. For many individuals—especially young adults and professionals—broadband is an important requirement in choosing a community.

Technology continues to change, challenging all sectors of a community to learn new skills and adapt. Developing a broadband plan can help communities meet these challenges.

A broadband plan can help your community:

1. Increase awareness of new technologies;
2. Stimulate demand for broadband;
3. Support technology-related development, entrepreneurship, and innovation;
4. Work with telecommunications providers to make sure that the broadband needs of the community are met;
5. Stimulate job creation and business revenue;
6. Improve health care quality and help patients better manage their care;

## DEVELOPING A BROADBAND PLAN

A broadband plan can be integrated into a broader economic development plan or can be a standalone plan. It can be a simple plan, focusing on adoption of broadband technologies. Or it can be a more detailed plan, addressing technology adoption, digital literacy and public access, workforce development, innovation and entrepreneurship, broadband availability or affordability, and quality of life.

### ESTABLISH A BROADBAND COMMITTEE

The first step in developing a broadband plan is to establish a broadband committee. The committee should consist of representatives of the following sectors:

- Local government
- Business
- Economic development organizations
- Education
- Health care
- Libraries
- Agriculture
- Broadband providers
- Non-profits, arts, culture, and history groups (if possible)
- And other significant groups or sectors within the region

Extra effort should be made to recruit representatives of the region's largest users of telecommunications and information technology.

### SUGGESTED PLANNING PROCESS

1. Develop a common understanding of how the community is using broadband and the community's broadband-related needs. Here are some suggested activities to help your committee develop a shared understanding of how broadband is currently being used and the needs of each sector:

- Ask committee members to share how their organizations are currently using broadband and what they are planning in the near future.
  - Discuss where broadband is available. Go to the [Nebraska Broadband Map](#) to see where broadband is available.
  - Discuss broadband adoption and utilization in the community. Is broadband subscribership below, at or above the state average (link to broadband survey information below)? Are residents satisfied with broadband service?
  - Discuss business utilization of broadband technologies. Are local businesses using broadband below, at or above the state level of utilization (link to business use of broadband information)? Are businesses satisfied with broadband service?
  - Visit local businesses, schools, and/or hospitals to see how they are using technology.
  - Identify the largest telecommunication users in the community and meet with them to learn how they are using technology, how much they are spending on telecommunications and information technology, what their current and future technology needs are, and what the region/community can do to help them meet their technology needs.
2. Develop a shared vision of how the community will be using broadband in the near future
    - How will businesses be utilizing broadband?
    - How will broadband be used in education, health care, libraries, and local government?
    - How will residents be utilizing broadband?

3. Identify priority areas and conduct an initial assessment of each area. A broadband plan may address all of the following areas or just a few areas that have been prioritize by the committee:

[Broadband Availability/Affordability](#)

[Skilled IT Workforce](#)

• [Workforce Development](#)

• [Recruitment/Community Marketing](#)

[Innovation/Entrepreneurship](#)

[Digital Literacy and Public Access](#)

[Broadband/Technology Adoption](#)

• [Businesses](#)

• [Agriculture](#)

• [Education \(Link\), Health Care \(Link\), Government \(Link\), and Libraries](#)

• [Digital Literacy and Public Access](#)

[Quality of Life](#)

The Nebraska Broadband Initiative has developed an [assessment tool](#) which can be downloaded and printed.

4. Identify areas in which more information needs be gathered or a more thorough assessment needs to be made.

5. Develop a plan to achieve this vision.

A simple plan may consist of just a few action items. Some communities may take a more

comprehensive approach and may have a much more extensive plan. Either way, be sure to include a few relatively easy action items to help build momentum

Here are some additional activities to consider:

- Hold a community forum to discuss broadband issues.
- Encourage local businesses to work with area schools, community colleges, colleges, and/or universities on internship programs.
- Encourage a culture of innovation and entrepreneurship by organizing meeting ups of entrepreneurs/start-ups.
- Form a makers club or host meet ups.
- Explore connectivity models for libraries such as partnering with schools or joining the State’s education network, Network Nebraska.
- Assess the demand for a coworking space or meeting room available for home-based businesses/start-ups. Discuss the community’s broadband needs with broadband providers.
- Partner with a local university, college, community college or high school or library to develop a maker space.
- Work with public safety organizations/first responders to develop a plan to use social media to provide emergency information.

## SAMPLE OUTLINE FOR A COMMUNITY BROADBAND PLAN

### VISION

Address one or two of the following in your vision for broadband in your community:

- Describe how businesses will be using broadband.
- Describe how agricultural producers will be using broadband.
- Describe how residents will be using broadband.
- Describe how broadband will be used in education, health care, libraries, and local government.
- Describe how broadband will make your community a better place.

Here is a sample vision statement from the [North Central Region Broadband Plan](#):

Residents and businesses in the North Central region of Nebraska, a predominantly rural area, will have access to digital information and communication tools and the training to use them as skillfully as urban Nebraskans.

Here is a sample vision statement from the [Western Region Broadband Plan](#).

A long-term vision to increase youth retention and facilitate business transitioning, increase economic development, and decrease the digital divide and “digital deserts” was developed at the one-day regional summit.

### PRIORITY AREAS

Identify priority areas (i.e., adoption of technology by businesses; adoption of technology by agricultural producers; adoption of technology by education, health care,

government, and/or libraries; digital literacy/public access; workforce development; recruitment/community marketing; innovation, entrepreneurship, broadband availability/affordability).

For Each Priority Area:

- Describe the current state (optional)
- Describe your goal/objective for each priority area.

Here is a sample from the [Western Region Broadband Plan](#).

**Priority 1:** Education, Digital Literacy and Advanced Technology Training – Coordinate and increase educational offerings around digital literacy skills and advanced technology training.

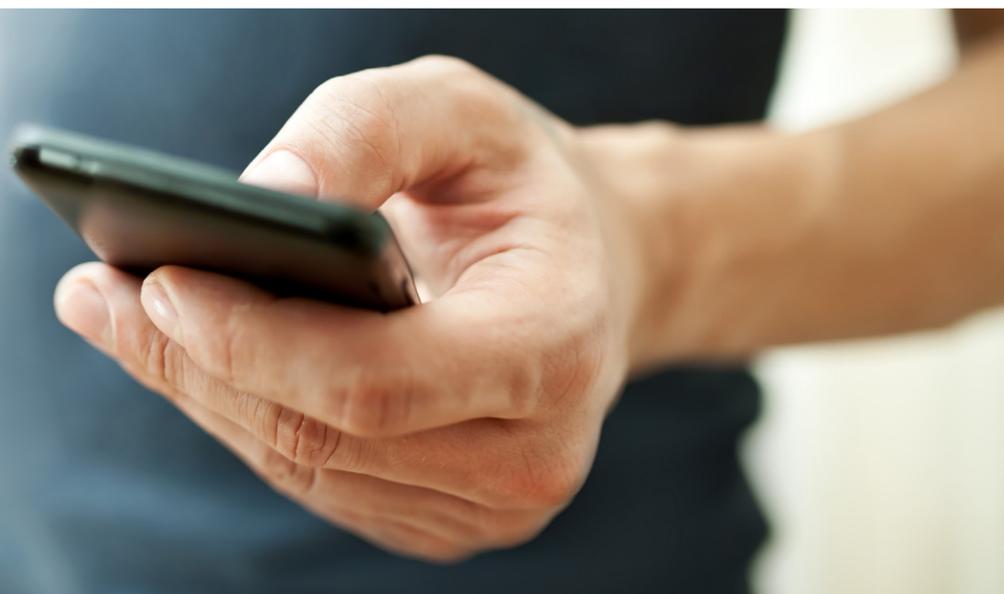
**Priority 2:** Economic Development – Expand awareness and growth of technology educational offerings to strengthen economic development, agritourism and entrepreneurship.

- List planned activities to address this priority area. It is often helpful to include the entity or individual taking the lead, an approximate time frame, and how the project will be funded.

*Note: A simple, brief plan that is implemented is better than a professionally produced plan that sits on the shelf. It is OK to start with one or two priority areas and just a couple of action items.*

### RESOURCES

Additional resources are available at [broadband.nebraska.gov](http://broadband.nebraska.gov).





## 10 TECHNOLOGY TRENDS

### SOCIAL MEDIA IS CHANGING HOW WE COMMUNICATE

New technologies and applications are changing the way we communicate. Communities, local governments, businesses, and community organizations need to recognize new communications trends in order to effectively communicate. Here are just a few examples of how social media is changing how we communicate:

- The star of the 2014 University of Nebraska Spring Game was a cat made famous by Twitter user FauxPelini.
- An article in the Omaha World-Herald in March 2014 highlighted how University of Nebraska coach Tim Miles was building fan support by posing for selfies with fans.
- Twitter is being used by the National Weather Service, the Weather Channel, local news organizations, and public safety organizations to provide up-to-date information on developing weather-related emergencies.
- Foodies, crafters, brides, mothers planning birthday parties, and home owners planning renovations are using Pinterest to get ideas, sometimes causing stress for those who are unable to live up to Pinterest-generated expectations.
- In December 2013, Beyonce' used Instagram to announce the surprise release of her new album on iTunes, bypassing traditional marketing and distribution models.
- Have a question about how to do something? Youtube has become the source of instructional videos as well as funny cat videos and music videos.
- Photos and videos are an integral part of the online social experience, with 54% of online adults posting original photos or videos to social media sites. (Source: [Pew Internet](#))
- Businesses are increasingly using social media. Social media marketing budgets are projected to double in the next five years. (Source: [Business2Community](#))

- 76% of business to business companies maintain blogs; Business to business companies that blog generate 67% more leads than those that don't. (Source: [Business2Community](#))

How many adults are using social media? Here are some recent statistics from a [2013 Pew Internet survey](#):

- 73% of online adults use social networking sites.
- 71% of online adults use Facebook.
- 17% use Instagram.
- 21% use Pinterest.
- 22% use LinkedIn.
- 18% use Twitter.

A [2014 survey of Nebraska households](#) also reveals high use of social media with 80% of online households indicating that they use social networking.

### BROADBAND HAS GONE MOBILE

More and more people are using smartphones or other mobile devices to access the Internet. The number of mobile broadband connections now nearly equals the number of fixed broadband connections. At the end of 2012, there were 64 million mobile connections and almost 65 million fixed connections in the United States. (Source: [FCC](#))

A [2014 Pew Research Internet Project survey](#) found that that 92% of adults have a cell phone and that 55% of adults have a smartphone. Business use of mobile devices is even higher with over 88 percent of Nebraska businesses using some form of web-enabled mobile device. Mobile broadband is not just for checking e-mail and Facebook. Mobile broadband is being used in businesses and agriculture for remote monitoring and for controlling devices.

### ONLINE VIDEO IS HUGE

Online video viewing continues to grow. Nearly 80% of Nebraska households with Internet access watch videos online according to a [2014 survey](#). In March 2014, 87.8 million Americans watched 46.6 billion online videos. Google sites, including YouTube.com, had 155.6 million unique viewers, ranking first among video sites. (Source: [Comscore](#))

Organizations, businesses and public interest groups are taking advantage of this trend by showcasing content via online video as part of their marketing strategy. Adding videos to landing pages can increase conversions by nearly 90%. (Source: [Business2Community](#))

Not only is watching video online a popular past time, but video creation and sharing is also becoming more popular. Sites like Youtube, Facebook, and Twitter make it easy to share videos. Almost a third (31%) of online adults have uploaded a video to the Internet according to a [2013 Pew Internet survey](#).

### SERVICES ARE MOVING ONLINE, MAKING PUBLIC ACCESS CRITICAL

Governments, businesses, and educational institutions have moved many applications and services online, allowing Internet users to access services 24 hours a day. Many Internet users now expect the convenience of online access to services, and they expect services designed to be accessed via a mobile device.

However, the movement of services from more traditional methods to online, threatens to leave non-users behind. It is now difficult to apply for jobs, apply to colleges, register for classes and apply for benefits without access to the Internet. Unfortunately, those who are often most in need of these services are also the most likely to lack access to the Internet and to need training and

assistance. Sites which provide public access to the Internet and basic training play a critical role in bridging the digital divide. A [2014 survey of Nebraska households](#) found that thirty-two percent of Nebraska households without Internet access use the computer resources at local public use facilities.

### LOCATION-BASED SERVICES KNOW WHERE YOU ARE

There are many types of services which utilize data about location. Many of us now have GPS devices in our cars or phones to help us navigate. Newer applications, called location-based services, are leveraging local information generated by mobile devices.

Sites like Foursquare and Facebook use mobile devices, GPS and geolocation capabilities to notify others of their location by ‘checking in.’ This type of information about customer’s habits is useful to businesses who can direct market by sharing coupons, providing special deals, rewards, and discounts with the people who are signed in. Users may also be able to leave comments or reviews for a certain business or other location, which may be viewed by later visitors.

Geocaching is another popular activity which utilizes GPS devices. Geocaching is a high-tech, outdoor treasure hunting game in which players use GPS devices to locate hidden containers, called geocaches. There are over 1.3 million active geocaches and 5 million geocachers worldwide.

### CLOUD COMPUTING IS CHANGING SERVICE MODELS

Cloud computing is dramatically changing the way information technology services are delivered and supported. In general, cloud computing refers to the use of software applications via the Internet rather than installation of software on a local computer, similar to the delivery system for electricity and other utilities. Online banking, social networking

and interactive video services such as Skype, accessible through a web browser, are examples of cloud computing services.

In some respects, cloud computing is similar to mainframe computing, where computing power is centralized and delivered to remote devices. Centralized development and support of software services through the cloud can reduce on-premise requirements and costs for equipment, software development and technical support. Concerns about cloud computing typically involve privacy, security and availability, as well as, the desire of some to maintain complete control over equipment, software and data.

### IT WORKERS ARE IN HIGH DEMAND

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. A total of 1,788 degrees and certificates in the field of IT were awarded in the state of Nebraska in the 2011-2012 academic year, an increase of 110.85% from the previous year according to an [AIM study](#). A majority (88%) of Omaha-area [employers surveyed in 2013](#) considered their recent IT-hires to be excellent (40%) or good (48%). However, many employers still report a shortfall. Just over half of Omaha area businesses surveyed in 2013 (52%) indicated that the local supply of IT talent was excellent (10%) or good (42%). Businesses outside of Omaha and Lincoln may find recruiting IT talent even more challenging.

### HEALTH APPLICATIONS WILL BE THE NEXT KILLER APP

Health information technology (health IT), often referred to as eHealth, promises to improve the quality of patient care and consumer safety. Within the next few years, most Nebraskans will benefit from the adoption of health IT.

A doctor seeing a patient in the emergency room for chest pains will have access to the patient’s medication history, reducing the possibility of an adverse drug interaction. A pediatric cardiologist seeing a high school athlete who passed out at the State Cross Country Meet will have access to tests run by the patient’s primary care physician. A doctor prescribing a statin for a patient with high cholesterol levels will have access to the formulary information and will be able to more easily choose a statin which will be covered by the insurer. Nurses will be able to remotely monitor patients with chronic conditions and help patients better manage their care.

Consumer adoption of health technologies is also growing, led by the adoption of applications which monitor fitness like Fit Bit. As more applications are developed and these applications become more interoperable, patients will be able to better manage their care and their fitness.

### TABLETS AND E-BOOK READERS ARE GROWING IN POPULARITY

Tablet devices (like the iPad) and e-readers, are becoming increasingly popular. A [2013 Pew Internet study](#) found that 35% of Americans 16 and older had a tablet computer and 24% had an e-book reader. The increase in tablet devices is contributing to the increasing demand for mobile broadband. The iPad or other media tablets may be ideally suited for certain business, education, government and health care applications—for example, allowing doctors to securely connect to a hospital’s electronic health record or to prescribe medications. Although tablets are often considered the toys of tech-savvy early adopters, they may also be a great device for those who have special needs or technophobes. Some educators and parents are finding that children with autism or other conditions can more easily utilize the iPad. It is

possible that some technophobes may find an iPad more appealing than a computer.

The rapid adoption of e-book readers signals a shift in how consumers are accessing books and a shift in the traditional publishing industry. Many libraries are adapting to changing consumer preferences by loaning e-books. The rise of the e-book has also opened up opportunities for authors who can now self-publish and sell an e-book on Amazon.com.

### TECHNOLOGY IS FACILITATING COLLABORATION

Technology is making unprecedented levels of both collaboration and innovation possible. The term “crowd sourcing” is often used when referring to innovative efforts to leverage mass collaboration. Wikipedia is perhaps the best example of how the efforts of individuals from across the world can be harnessed. More than 91,000 active contributors have developed this free-content encyclopedia which was developed using an openly editable model.

Open-source software is another example of the power of collaborative effort. Open-source software is built and maintained by a network of volunteer programmers. Examples of open source software include the Apache HTTP Servicer, Mozilla Firefox, and the GNU/Linux operating system.

Apple has also leveraged the collective talent of the “crowd.” In 2007 Apple released a software development kit that allowed developers to make applications for the iPhone and iPod Touch and submit applications for inclusion in the Apple App Store. On Jan. 22, 2011, the Apple App store reached the milestone of having the 10 billionth app downloaded. More than 350,000 free and paid apps are available for the iPhone, iPad, and the iPod Touch. Other mobile devices are now also offering apps.

## GLOSSARY OF TELECOMMUNICATIONS INFRASTRUCTURE TERMS

The glossary includes some commonly used infrastructure terms. Here are a number of sources which provide telecommunication infrastructure definitions:

[Nebraska Information Network Technology Definitions](#)

[TIA](#)

[Technopedia](#)

[ALTHOS Online Communication Dictionary](#)

[FCC Broadband Plan](#)

[\(Glossary is on page 351, appendix C\).](#)

Newton's Telecom Dictionary is another useful source.

**ACCESS POINT.** Location on a network where switches or other electronic devices have been installed so that there is access to the network. There are also pricing access points where the network is not actually accessed but the service is priced as if there was physical access to the network at that location. The carrier "backhauls" the service to the physical location point.

**BACKBONE.** A high-speed line or series of connections that forms a major pathway within a network. The term is relative as a backbone in a small network will likely be much smaller than many non-backbone lines in a large network.

**BACKHAUL.** The telecommunications link used to transport traffic from a geographically distance point, such as a wireless base station, to a significant aggregation point in the network, such as a mobile telephone switching office or Internet peering point. (FCC Broadband Plan Glossary)

**BANDWIDTH.** The amount of information can be transmitted at one time based on the range of electrical frequencies the end devices on the network can handle.

**BROADBAND.** Data transmission technology that provides two-way data transmission to and from the Internet with advertised speeds of at least 768 kilobits per second (kbps) downstream and at least 200 kbps upstream to end users, or providing sufficient capacity in a middle mile project to support the provision of broadband service to end users within the project area.

**BROADBAND SERVICES.** Broadband services exceed 200 kilobits per second in both directions. Some experts estimate that in four to five years, broadband with speeds of 25 to 40 megabits per second will be needed. DSL and cable modems typically provide 1-2 megabits per second. Most of the DSL that is in place is capable of handling 8 megabits per second by changing plug-in cards. DSL equipment is becoming available in two new versions. One version is capable of 20 Mbps and the second is capable of 40 Mbps. Most cable modem systems are capable of 30-40 megabits per second.

**CABLE MODEM SERVICE.** High-speed data service received through the cable system. The speed is typically 1-2 Mbit/s, although systems are capable of providing speeds of 30 to 40 Mbps and the distance can be 100 km or even more.

**CARRIER OF LAST RESORT.** The carrier that commits (or is required by law) to provide service to any customer in a service area that requests it, even if serving that customer would not be economically viable at prevailing rates.

[\(FCC Broadband Plan Glossary\)](#)

**COMMUNITY ANCHOR INSTITUTIONS.** Schools, libraries, medical and healthcare providers, public safety entities, community colleges and other institutions of higher education, and other community support organizations and entities.

**DARK FIBER.** Fiber furnished with no termination equipment (i.e., lasers or electronics). Purchasing or leasing dark fiber requires the entity securing the service to invest the capital dollars for the terminating lasers and electronics.

**DSL (DIGITAL SUBSCRIBER LINE).** High-speed services provided over copper telephone lines providing voice and data (typically Internet) services. The reach (distance from the main telephone office or any remote line group in the countryside) has ranged from 18,000 route feet to approximately 24,000 route feet. Recently a new vendor product has become available, being deployed in Nebraska, that allows for retrofitting many of the existing DSL lines to achieve a range of over 40,000 feet providing multiple voice lines and data at speeds up to 712 Kbps in both directions.

**DUCT.** A conduit, usually placed in "bundles" of four or more (depending upon the number the carrier thinks may be needed in the next 20 or so years), through which fiber cable is placed (pulled). Copper cables occupy many older conduits and can be pulled out to make room for fiber and thus gaining significant capacity.

**END USER.** A residential or business party, institution or State or local government entity, including a Community Anchor Institution, that may use broadband service for its own purposes and that does not resell such service to other entities or incorporate such service into retail Internet-access services. Internet Service Providers (ISPs) are not "end users" for this purpose.

**FIBER (OPTICS).** Thin filaments of glass through which light beams are transmitted over long distances carrying enormous amounts of data. Modulating light on thin strands of glass produces major benefits in high bandwidth, low power consumption, small space needs, security, and total insensitivity to electromagnetic interference.

**FIBER CABLE.** The assembling of many thin filaments of glass into a single cable where the bundled glass filaments are then protected by exterior sheathing of polyethylene and sometimes a metal wrap with another sheathing of polyethylene material.

Fiber to the x (FTTX) refers to any broadband network architecture using optical fiber to provide all or part of the local loop. (Wikipedia)

Fiber to the Node or Neighborhood (FTTN) Fiber is terminated in a street cabinet, possibly miles away from the customer premises, with the final connections being copper. (Wikipedia)

Fiber to the Premise (FTTP) or Fiber to the Home (FTTH) Fiber reaches the boundary of the premise. (Wikipedia)

**FIXED WIRELESS DATA SERVICE.** High-speed services provided over wireless to a fixed location. Often a dish or receiver must be attached to the roof and positioned to face the nearest wireless transmitter.

**HIGH-SPEED SERVICES.** Most consumers consider high-speed services to be anything faster than a dial-up 56 kbps connection. This is the simplest definition and the one that we will use in this workbook. Some people equate the term high-speed services to broadband which is defined by the FCC as faster than 200 Kbps. Others—usually those who have worked with telecommunications for some time—use the term high-speed services to mean speeds faster than a T-1 or faster than 1.544 Mbps.

**ISDN (INTEGRATED SERVICES DIGITAL NETWORK).** ISDN can typically provide speeds of roughly 128,000 bits per second over phone lines. ISDN is used for videoconferencing and can be more cost effective than having a T-1 line or fractional T-1 for an occasional user of videoconferencing because it is often priced based on hours of use.

ISDN is a 2B + D configuration. The “B” channels are 56Kbps and the “D” channel is 16 Kbps. You can configure up to a 23B + D service which would equal a T-1 or 1.544 Mbps.

**LAST MILE PROJECT** means any infrastructure project the predominant purpose of which is to provide broadband service to end users or end user devices (including households, businesses, community anchor institutions, public safety entities, and critical community facilities).

**LOUP** The connection from the network central office to the customers’ premises.

**MESH NETWORKS.** Mesh networks provide redundant connections among access points and eliminates the need to have a connection to the Internet at each access point. The new mesh network equipment is making it more affordable to create WIFI networks.

**MIDDLE MILE.** Project means a broadband infrastructure project that does not predominantly provide broadband service to end users or to end-user devices, and may include interoffice transport, backhaul, Internet connectivity, or special access. Mobile Digital Wireless Data Service. Voice and data (e-mail, etc.) can be transmitted to a digital cellular phone, PDA, or laptop equipped with a wireless receiver. WIFI is one of the most popular forms of mobile digital wireless data service.

**RURAL AREA.** Any area, as confirmed by the latest decennial census of the Bureau of the Census, which is not located within: (i) A city, town, or incorporated area that has a population of greater than 20,000 inhabitants; or (ii) an urbanized area contiguous and adjacent to a city or town that has a population of greater than 50,000 inhabitants. For purposes of the definition of rural area, an urbanized area means a densely populated territory as defined in the latest decennial census of the U.S. Census Bureau.

**SERVICE AREA.** The entire area within which an existing service provider offers broadband service.

**SERVICE LOCATION.** The specific geographic point or location at which a service provider offers broadband service, such as a specific residence or business.

**UNDERSERVED AREA.** An area composed of one or more contiguous census blocks meeting certain criteria that measure the availability of broadband service and the level of advertised broadband speeds.<sup>12</sup> Specifically, an area is underserved if at least one of the following factors is met, though the presumption will be that more than one factor is present: (i) No more than 50 percent of households in the service area have access to facilities-based terrestrial broadband service at greater than the minimum broadband transmission speed (set forth in the definition of broadband above); (ii) no fixed or mobile broadband service provider advertises broadband transmission speeds of at least three megabits per second

(“mbps”) downstream in the area; or (iii) the rate of broadband subscribership for the area is 40 percent of households or less.<sup>13</sup> A household has access to broadband service if the household can readily subscribe to that service upon request..

**UNSERVED AREA.** An area composed of one or more contiguous census blocks where at least 90 percent of households in the service area lack access to facilities-based terrestrial broadband service, either fixed or mobile, at the minimum broadband transmission speed (set forth in the definition of broadband). A household has access to broadband service if the household can readily subscribe to that service upon request.

**VOICE OVER INTERNET PROTOCOL (VOIP).** VoIP is the transmission of voice communications over the Internet.

**WIFI.** WIFI is short for wireless fidelity and refers to any type of 802.11 network which can be accessed by a computer with a wireless networking card.

**WIMAX.** WiMax is a wireless network running the Institute of Electrical and Electronics Engineers Inc.’s 802.16 standard, using licensed and unlicensed radio spectrums. The 802.16d standard, also known as 802.16-2004, can provide line-of-sight communication for up to 30 miles, though in-building coverage is estimated at closer to two miles.

**T1.** A dedicated connection providing transmission capacity of 1.54 Mbps. A T-1 can be multiplexed into 24 DS0 channels. DS0 is a 56 Kbps channel—the bandwidth used for voice service. The technical term for a T-1 is a DS-1 where DS stands for Digital Service.

**DS-3.** Sometimes referred to as a T-3, a DS-3 contains 28 T-1 lines (45 Mbps).

**OC-3 (OPTICAL CARRIER-3).** An OC-3 contains 3 DS-3s (155 Mbps). Note: The math of multiplying the number of T-1s in a DS-3 and the number of DS-3s in an OC-3 does not equate because of bandwidth used for signaling and control of the circuits.

*Roger Hahn from the Nebraska Information Network provided assistance in the development of this glossary.*

## IS YOUR COMMUNITY LEVERAGING BROADBAND?

### 1. Are community leaders aware of the importance of information technology and do they work together to address broadband development?

- Yes, community leaders are working together to address broadband development. (2 pts.)
- Some, but not all, community leaders are aware of the importance of information technology. (1 pt.)
- No, community leaders are generally not aware of the importance of broadband technology. (0 pts.)
- Don't Know (0 pts.)

### 2. Are government, businesses, and educational entities working together to address broadband development?

- Yes, government, businesses, and educational entities are working together. (2 pts.)
- There is some cooperation among government, businesses, and educational entities. (1 pt.)
- No, government, businesses and educational entities don't work together. (0 pts.)
- Don't Know (0 pts.)

### 3. Are local businesses effectively utilizing broadband?

- Yes, nearly all businesses are effectively using broadband. (2 pts.)
- Some businesses are effectively using broadband. (1 pt.)
- No, most businesses are not effectively using broadband. (0 pts.)
- Don't Know (0 pts.)

### 4. Are local businesses satisfied with the broadband services currently available?

- Yes, nearly all businesses are satisfied with the broadband services currently available. (2 pts.)
- Some businesses are satisfied with the broadband services currently available. (1 pt.)
- No, most businesses are not satisfied with the broadband services currently available. (0 pts.)
- Don't Know (0 pts.)

### 5. Are agricultural producers and agribusinesses effectively utilizing broadband?

- Yes, nearly all ag producers and agribusinesses are effectively using broadband. (2 pts.)
- Some ag producers and agribusinesses are effectively using broadband. (1 pt.)
- No, most ag producers and agribusinesses are not effectively using broadband. (0 pts.)
- Don't Know (0 pts.)

### 6. Do local schools use technology to enhance educational opportunities and communication with families? This may include distance education using synchronous interactive video or asynchronous web-based courses, using content management systems to support classroom learning, using web-based systems that let parents check grades or lunch balances, and/or using web-based systems to schedule parent teacher conferences.

- Yes, local schools are effectively using technology. (2 pts.)
- Local schools are using broadband for some applications, but could be doing more. (1 pt.)
- No, local schools are not effectively using broadband. (0 pts.)
- Don't Know (0 pts.)

# quiz

**7. Do local hospital and health care providers use technology to improve patient care? This may include using telemedicine for patient consultations with specialists, participating in health information exchange, providing patient access to health information, and utilizing technology to remotely monitor patients.**

- Yes, hospitals and health care providers are sharing health information electronically and are using telemedicine and remote technology to improve patient care. (2 pts.)
- Hospitals and health care providers have implemented electronic health records, but most providers are not sharing health information. Telemedicine may also be in use. (1 pt.)
- No, hospitals and health care providers are not using electronic health records or telemedicine. (0 pts.)
- Don't Know (0 pts.)

**8. Are local governments using technology to communicate with citizens, to provide information, and to provide services?**

- Yes, local governments are effectively using technology to communicate and provide services. (2 pts.)
- There is some use of technology by local governments. (1 pt.)
- No, local governments are not effectively using technology to communicate and provide services. (0 pts.)
- Don't Know (0 pts.)

**9. Does the local library offer access to computers and the Internet and free or affordable training on basic computer and Internet skills?**

- Yes, the local library offers access to computers and the Internet and provides training. (2 pts.)
- The local library provides limited access to computers and the Internet and limited training. (1 pt.)
- No, the local library does not provide access to computers and the Internet. (0 pts.)
- Don't Know (0 pts.)

# quiz

**10. Is the local library using technology to effectively deliver services and information? This may include offering e-books, online renewals, and access to new technologies like 3D printers. It may also include using social media to publicize library programs.**

- Yes, the local library is using technology effectively to deliver service and information. (2 pts.)
- The local library is using some technology to deliver services. (1 pt.)
- No, the local library is not using technology to deliver services and information. (0 pts.)
- Don't Know (0 pts.)

**11. Do most households subscribe to broadband service? In 2014, 82% of households in Nebraska subscribed to broadband service.**

- Nearly all households (90% or more) subscribe to broadband service. (2 pts.)
- The community is near the state average in households subscribing to broadband service. (1 pt.)
- Broadband subscription in the community is less than the state average. (0 pts.)
- Don't Know (0 pts.)

**12. Is there an adequate IT workforce to meet the demands of local businesses?**

- Yes, there is an adequate IT workforce. (2 pts.)
- Some businesses have a hard time recruiting IT workers. (1 pt.)
- A shortage of IT workers is a significant concern. (0 pts.)
- Don't Know (0 pts.)

**13. Are there opportunities for advanced information technology training through local high schools, colleges and universities, or other institutions?**

- Yes, there are adequate opportunities for advanced technology training. (2 pts.)
- There are some training opportunities, but more are needed. (1 pt.)
- There are no opportunities for advanced IT training. (0 pts.)
- Don't Know (0 pts.)

# quiz

## 14. Are programs which teach coding to youth offered in local schools or by other organizations?

- Yes, there are adequate opportunities for youth to learn coding. (2 pts.)
- There are some opportunities for youth to learn coding, but more are needed. (1 pt.)
- There are no opportunities for youth to learn coding. (0 pts.)
- Don't Know (0 pts.)

## 15. Does your community have a well-designed website which provides information for both prospective and current residents? Is information on a wide range of areas available and up to date, including information on health care, schools, local government, libraries, housing, and economic development?

- Yes, the community website provide is a good source of information. (2 pts.)
- The community website provides some information, but could be improved. (1 pt.)
- The community website provides very little current information. (0 pts.)
- Don't Know (0 pts.)

## 16. Does your community/region support entrepreneurship and innovation through business incubation facilities, meet ups for entrepreneurs, coworking facilities, maker spaces/clubs, or other programs for start-ups?

- Yes, several programs support beginning businesses. (2 pts.)
- There are limited programs which supports beginning businesses. (1 pt.)
- There are programs which support beginning businesses. (0 pts.)
- Don't Know (0 pts.)

## 17. Is adequate broadband service available to all businesses, organizations, and residents?

- Yes, adequate broadband services are available to all businesses, organizations, and residents. (2 pts.)
- Adequate broadband services are available to nearly all businesses, organizations, and residents. (1 pt.)
- No, adequate broadband service is not available. (0 pts.)
- Don't Know (0 pts.)

# quiz

## 18. Does your community have affordable access to broadband service?

- Yes, affordable broadband services are available. (2 pts.)
- The cost of broadband services is a barrier for some businesses and residences. (1 pt.)
- The cost of broadband services is a significant barrier to adoption. (0 pts.)
- Don't Know (0 pts.)

## 19. Does your community have adequate mobile broadband service?

- Yes, adequate mobile coverage is available. (2 pts.)
- Adequate mobile coverage is available in most, but not all areas. (1 pt.)
- Mobile coverage is a significant issue. (0 pts.)
- Don't Know (0 pts.)

## 20. Does your community pay careful attention to quality of life issues? A high quality of life is essential to attract and retain IT workers and businesses.

- Yes, the community has a great quality of life. (2 pts.)
- The community has a fair quality of life. (1 pt.)
- The community needs to address quality of life issues. (0 pts.)
- Don't Know (0 pts.)

## SCORING.

Give your community one point for each question answered with a "yes":

**0-20** Stage I

**21-35** Stage II

**36-40** Stage III

This assessment has undergone many revisions. Many of the original assessment questions were drawn from *Building eCommunities: Getting Everyone Connected* by Andrew Michael Cohill, available at <http://www.designnine.com/library/docs/ecommunities.pdf>.

