

Community Technology Action Plan

Kent County, Michigan: February 2017



Prepared as part of the Connected
Community Engagement Program



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The following organizations
contributed their time and
expertise as part of the Kent
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Committee:

The Right Place
Kent County Government
Downtown Grand Rapids, Inc.
City of Grand Rapids
Several Municipality Governments
Kent Intermediate School District
Kent County Health Department
West Michigan WORKS!
Start Garden
LINC Community Revitalization
616 Development
Graybar
ACD.net
Charter Communications
Comcast
FreedomNet
Frontier Communications
I-2000
Lightspeed
Lynx Networks
Michwave
Spartan Net

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EXECUTIVE SUMMARY

Today, technology plays a pivotal role in how businesses operate, how institutions provide services, and where consumers choose to live, work, and play. The success of a community has become dependent on how broadly and deeply the community adopts technology resources, which includes access to reliable, high-speed networks, digital literacy of residents, and the use of online resources locally for business, government, and leisure. As noted in the National Broadband Plan (NBP), broadband Internet is “a foundation for economic growth, job creation, global competitiveness and a better way of life.”

The purpose of this document is to summarize the results of a community technology assessment for Kent County and to provide the next steps for addressing any deficiencies or opportunities for improving the local technology ecosystem in order to advance economic, social, and educational opportunities for families, businesses, and institutions in the community.

This Community Technology Action Plan was developed following a comprehensive community assessment performed by the Kent County Broadband Advisory Committee as part of Connected Nation’s Connected Community Engagement Program. Using the Connected assessment toolkit, the community team was able to examine the access, adoption, and use of broadband and related technologies in the community.

One key output from this process is the Connected Community Scorecard, which is used to summarize the results of the community broadband assessment and relative standing of communities participating in this process. Through the work of the Kent County Broadband Advisory Committee and information reflected in this document, Kent County achieved a score of 77.99 points out of 100 for overall broadband and technology readiness, and has achieved Connected certification.

Connected certification recognizes that a community has measurably demonstrated proficiency for effective access, adoption, and use of broadband and broadband-supported technologies. This national platform recognizes communities that are excelling in their pursuit of accelerated access, adoption, and use of broadband. While an exciting accomplishment for any community, it is critical to stress that Connected certification is not the end of the Connected program. In fact, Connected certification, while recognizing work completed to date, marks the launch of the Technology Action Plan and the beginning of a community’s journey to continually improve its broadband landscape. Maintaining community collaboration and progress during plan implementation is a difficult task, but one that will result in an improved standing in the digital economy. Additionally, Connected certified communities, and all communities engaged in the Connected program, are part of a nationwide network of stakeholders, all working toward the

same goal: improved broadband access, adoption, and use. While every community is different, many share common issues, and Connected works to identify the best practices for solving these issues and share them with this network. Together, Connected Communities can work to bring affordable, reliable, and high-capacity infrastructure to underserved areas; promote adoption via skills training and education; and facilitate the advanced use of technology among all sectors to create more sustainable, resilient, and prosperous communities.

More information at www.connectmycommunity.org.

While the results indicate that the community has made tremendous strides and investments in technology, priority projects were identified to help catapult the community to a new level of technology access, adoption, and use.

Key priority projects include:

Continue to hold periodic Kent County broadband meetings with a core group of community leaders and providers to address broadband-related concerns and support new projects.

Share results of Residential Broadband Survey with local providers to raise awareness of availability and speed issues, and to help support a business case for improvements.

Keep surveys available for use by other Kent County municipalities, business sectors, and organizations that desire more in-depth assessment of their broadband needs.

Identify partnerships with broadband providers, as appropriate, to help address needs in local municipalities where broadband availability and speed is lacking.

Pursue Federal and State of Michigan assistance in enabling greater broadband expansion through funding, regulation, or other actions.

This plan is a blueprint for leveraging technology to improve quality of life and advanced community and economic development. Below are the detailed results and recommended strategies for Kent County.

Project Background

As home to the second largest city in Michigan (Grand Rapids) and the center of the fifth fastest growing economic region in the US (West Michigan), Kent County has established itself as a great place to work, live and play. To help manage this growth and plan for the future broadband needs of its urban and rural residents and businesses, Kent County embraced Connect Michigan’s “Connected” program as part of a larger initiative through the West Michigan Prosperity Alliance. This effort aims to assess and plan for the current and future broadband needs of each of the

Region's 13 counties, to ultimately form a region-wide broadband plan.

With a diverse mix of industries, population centers and cultural environments, Kent County's demand for broadband infrastructure and supporting resources are also wide-ranging. While businesses in Grand Rapids consume and demand increasing bandwidth and speed, many urban residents struggle with the ability to adopt and afford broadband service. More rural communities look to support the growing requirements for teleworking and home-based businesses from their residents, and in some cases, providing acceptable broadband service of any kind. Still, as described in this report, **Kent County's broadband environment is exceptional overall and should be recognized for its strength and breadth.** And by identifying its key areas of concern and resulting action plans, Kent County is demonstrating its commitment to further improving its broadband capabilities for the future.

Current Community Technology Developments

In response to the anticipated growth and demand across Kent County, several broadband providers are investing in network improvements for their business and residential customers. Comcast recently announced a \$2.8 million expansion of its fiber-based network in Kent County that will add nearly 33 miles of fiber for local businesses. Charter Communications has recently completed their upgrade to an all-digital network across Michigan, including the Kent County area. AT&T and Frontier are currently enhancing and extending their networks into more rural areas of the county through the Connect America Fund program. And fixed wireless providers such as Michwave and FreedomNet have been working with more rural townships to improve their local broadband access.

Project Focus Areas

In addition to the Libraries/Community Organizations Use focus area, the Kent County Broadband Advisory Committee chose to examine three additional Use areas including: Government, Higher Education, and K-12 Education.

INTRODUCTION

Despite the growing dependence on technology, the United States Census reports that 27% of Americans do not have a high-speed connection at home. Connected Nation's studies also indicate that 19.1 million children do not have broadband at home, and 6.1 million of those children live in low-income households. In 2014, Connected Nation also surveyed 4,206 businesses in 7 states. Based on these data, Connected Nation estimates that at least 1.5 million businesses (20%) in the United States do not use broadband technology today.

In this environment, deploying broadband infrastructure, services, and applications, as well as supporting the universal adoption and meaningful use of broadband, are challenging— but required—to advance twenty-first century technologically empowered communities. From healthcare, agriculture, public safety, and tourism, to government, education, libraries, talent, and economic activity, every sector of a community requires the power of broadband and related applications to function at the highest capacity.

One thing is clear, broadband and related technologies have transformed nearly every facet of society. While many of these technology changes can be discussed at a global scale, local community technology advancements depend on community leadership and action. A critical first step in advancing broadband technology is identifying and understanding local assets along with opportunities and barriers to technology advancement. This plan is a roadmap to advancing technology in Kent County.

The Connected Community Engagement Program

For over 10 years Connected Nation has been assisting communities in the development of Community Technology Action Plans through various internal programs that have ultimately progressed into the Connected program.

The Connected Community Engagement Program is a facilitated broadband and technology planning program designed to address the most pressing technology challenges facing communities today. Connected engages local leaders to evaluate their community's current state of technology access, adoption, and use. Connected offers communities the opportunity to measure the supply, demand, and use of technology in the community with unprecedented data gathering, analysis, and planning. Connected's unique community technology assessment provides insight into the local technology ecosystem, identifies gaps and opportunities, and supports the development of an actionable technology plan to improve the community's standing in the digital economy.

Connected communities benefit in many ways:

Benchmarking and planning: Determine where the community stands in relation to similar places and

national benchmarks. Inform a technology planning effort with unprecedented data on infrastructure, adoption, and use. Connected helps communities gather and analyze data on technology use across sectors, from agriculture to education and healthcare to public safety.

Recognition: Leverage Connected certification status and plan as a recruitment tool for residents and industry. Communities need a competitive advantage they can promote in order to thrive.

Network with other communities: Collaborate with other communities and partners—share best practices, spread policy insights, disseminate solutions, gather information, and adapt to evolving opportunities.

Create an empowered and informed community team: The Connected process educates, empowers, and unifies community leaders and cross-sectorial stakeholders to address broadband issues, develop a vision, and manage their action plan.

Process

In order to determine the state of technology in Kent County, the community team participated in a 4-step community engagement process that consisted of:

Community Team Creation – Empowering a community team leader (local champion) and creation of a community team composed of a diverse group of local residents from various sectors of the economy including education, government, healthcare, the private sector, and libraries, among many others.

Technology Assessment – The community team uses a series of instruments to gather community technology data. These instruments include a sophisticated set of surveys distributed throughout the community to gather hyperlocal data on the access, adoption, and use of broadband and technology that is not available anywhere else. The Connected assessment framework is broken into three categories: Access, Adoption, and Use. Each category has a specific number of points available for the community to earn toward Connected Certification. The Access, Adoption, and Use of broadband and technology are equally important for a community. The table below provides the total points available in each focus area and Use section before weighting.

The Use category, specifically, allows a community to tailor its assessment to the sectors of that community that most closely match the community's needs, strengths, and aspirations. The Libraries/Community Organizations Use assessment is required of all participating communities, but communities can then choose a minimum of four additional Use areas for assessment from among Agriculture, Economic Prosperity, Talent/Workforce, Government, Healthcare, Higher

Education, K-12 Education, Public Safety, and Tourism.

Following the tabulation of the total raw score and subsequent weighting, the community is provided its final Connected Assessment score.

Action Planning and Project Prioritization - This process entails the compilation of the results of the assessment, identification of best practices, and priority technology projects by the community team in collaboration with Connected Nation facilitators. Completion of the Community Technology Action Plan marks the beginning of a community's journey to improving its broadband landscape.

Connected Certification

Beyond the development of the Community Technology Action Plan, Connected certification recognizes that a community has measurably demonstrated proficiency for effective access, adoption, and use of broadband and broadband supported technologies. This national platform recognizes communities that are excelling in their pursuit of accelerated access, adoption, and use of broadband. While an exciting accomplishment for any community, it is critical to stress that Connected certification is not the end of the Connected program. In fact, Connected certification, while recognizing work completed to date, marks the launch of the Community Technology Action Plan. Maintaining community collaboration and progress during plan implementation is a difficult task, but one that will result in an improved standing in the digital economy.

Additionally, Connected certified communities, and all communities engaged in the Connected program, are part of a nationwide

network of stakeholders all working toward the same goal: improved broadband access, adoption, and use. While every community is different, many share common issues, and Connected works to identify the best practices for solving these issues and share them with this network. Together, Connected communities can work to bring affordable, reliable, and high-capacity infrastructure to underserved areas; promote adoption via skills training and education; and facilitate the advanced use of technology among all sectors to create more sustainable, resilient, and prosperous communities.

Connected Assessment Scorecard			
Category	Total Raw Points	Weight	Total Weighted Points
Access	60	33.33%	33.33
Adoption	70	33.33%	33.33
Use	40 x # of Categories Assessed	33.33%	33.33
Total Possible Points	530	100%	100
Points Needed for Connected Certification			75

Use Score Breakdown		
Use Category	Max. Possible Score	Required/Optional
Libraries and Community Orgs.	40	Required
Agriculture	40	
Economic Prosperity	40	
Entrepreneurship/Talent/Workforce	40	
Government	40	
Healthcare	40	
Higher Education	40	
K-12 Education	40	
Public Safety	40	
Tourism	40	
USE - Total Possible Points	40 x # of Categories	

ASSESSMENT AND DETAILED FINDINGS

The following sections provide detailed findings from the Connected Assessment for Kent County. Following the development of a broadband team, the community worked to gather data in three critical areas:

The **Access** focus area checks to see whether the broadband and technology foundation exists for a community. The criteria within the Access focus area endeavors to identify gaps that could affect a local community broadband ecosystem including issues related to last mile connections, cost, and competition.

Broadband **Adoption** is important for consumers, institutions, and communities alike to take the next step in fully utilizing broadband appropriately. The Adoption component of the Connected Assessment

seeks to ensure the ability of all individuals to access and use broadband and to recognize the value of a connection and its impact on quality of life.

Broadband **Use** is the most important component of Access, Adoption, and Use because it is where the value of broadband can finally be realized. However, without Access to and Adoption of broadband, meaningful Use of technology is not possible. Meaningful Use of broadband occurs when value to individuals, businesses, organizations, and institutions can be realized across the many sectors of a community.

Each focus area incorporates a series of metrics upon which the community is scored in order to quickly identify gaps and leverage opportunities.

Kent County, Michigan Connected Community Scorecard				
Category	Possible Points	Raw Score	Weight	Weighted Score
Access	60	54	33.33%	29.99
Adoption	70	54	33.33%	25.71
Use	160	107	33.33%	22.29
<i>Government</i>	40	24		
<i>Higher Education</i>	40	26		
<i>K-12 Education</i>	40	23		
<i>Libraries and Community Organizations</i>	40	34		
				77.99/100

Access

Broadband access refers to the infrastructure that enables a high-speed Internet connection. Broadband is delivered to a user via several technology platforms including cable, digital subscriber line (DSL) through a phone line), fiber-optics, fixed wireless, mobile wireless, and satellite. While these are currently the primary methods of delivery, new innovations and technologies are being developed that continue to improve the efficiency and speed of connectivity.

Broadband availability is essential infrastructure for twenty-first century communities. Broadband empowers a community to access applications ranging from healthcare to education, to business and government services. Unfortunately, many communities suffer from inequities of access on several fronts: between income levels; between urban and rural areas; between traditional business areas and nontraditional ones; and differing levels of service due to geography or infrastructure limitations.

Access to broadband is not simply a yes/no scenario. There are several aspects of broadband infrastructure that comprise the quality of the network in a community. For this reason, the Access focus area comprises six interrelated metrics that examine the quantity and quality of broadband in a community. These six areas are residential broadband availability, high-speed availability, competition, platform dependency, mobile broadband, and middle mile.

Access Highlights

96.4% Households with access to 25 Mbps Internet

Townships of Tyrone, Sparta, Grattan, Vergennes, Lowell, Bowne, Gaines, Caledonia, Byron, Cascade, Algoma, and Ada

Areas of the county where service gaps persist

90.6% Households with access to 100 Mbps Internet

41.1% Residents dissatisfied with their Internet service

92.9% Households with access to two or more ISPs

2.5% Households with access to only one type of connection

22 Residential ISPs

Access Assessment Score Summary		
Metric	Community Points	Possible Points
Residential Broadband Availability	10	10
High Speed Availability	8	10
Competition	10	10
Platform Dependency	10	10
Mobile Broadband	10	10
Middle Mile Infrastructure	6	10
Total	54	60

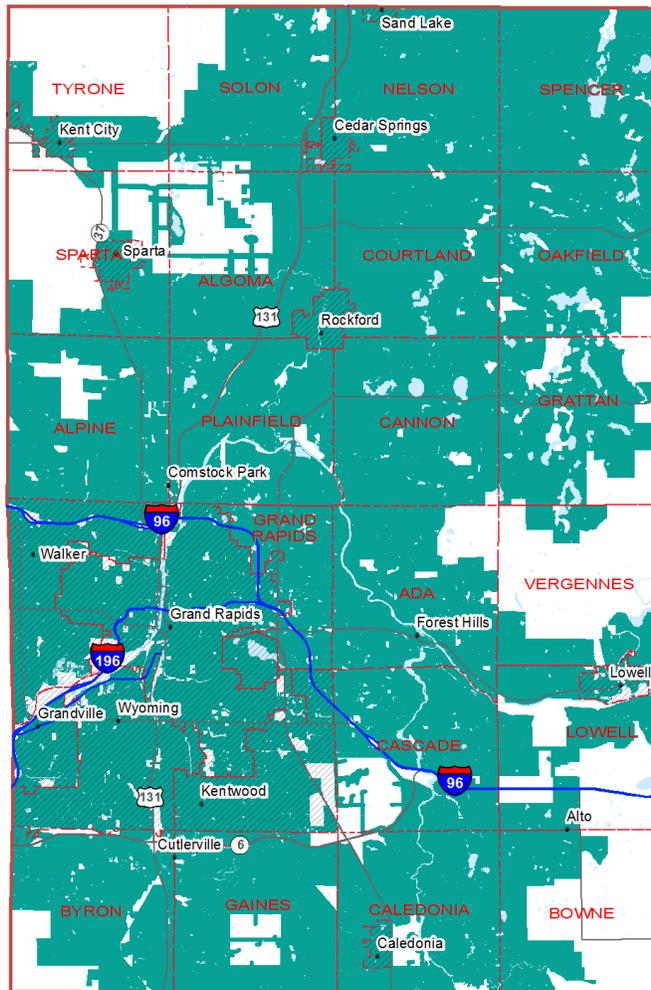
Residential Broadband Availability

A high-speed Internet connection is critical for families, students, businesses, and institutions to participate in the digital economy. Without broadband access, conversations of technology adoption and use are fruitless. The Federal Communications Commission (FCC) defines “advanced broadband service,” as an Internet connection of 25 megabits per second (Mbps) download and 3 megabits per second (Mbps) upload. While broadband connections do exist at speeds slower than this benchmark, 25 Mbps download and 3 Mbps upload represents the current aspirational goal for connecting every home in the United States.

Residential broadband availability is measured by analyzing the percentage of homes in the community that have access to fixed broadband speeds of 25 Mbps download and 3 Mbps upload. In 2015, Kent County had 232,961 households. Of these, 96.4% have access to broadband at the target speed.

Broadband availability often follows patterns of household density, so geographic disparities in availability do exist. The map of Residential Broadband Availability, provided, shows areas with and without broadband service at this speed (white areas are those without such service). Six broadband providers offer service meeting the 25/3 Mbps threshold: Charter Communications, Comcast, AT&T, Casair, Inc., LightSpeed Communications, and Vergennes Broadband.

The median download speed among surveyed residents who are aware of their connection speed is 17.5 Mbps, less than the benchmark used for this metric. While the median speed is lower than the FCC’s definition of “advanced broadband service,” many in the county, (48.2%) subscribe to slower speeds (as shown in the chart located at the



**25 Mbps
Download
and
3 Mbps
Upload**

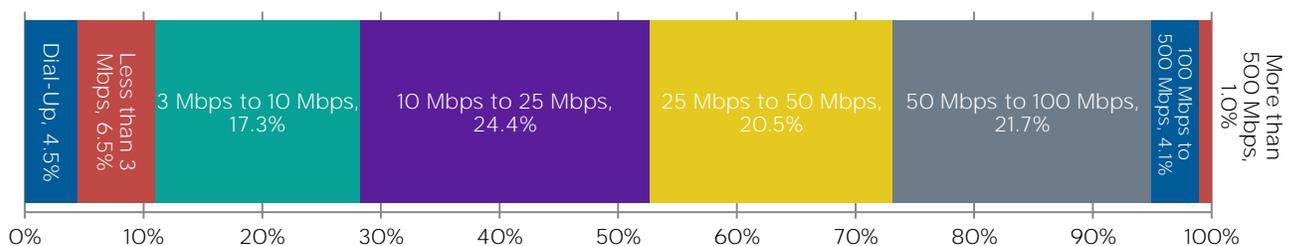
- Interstate
- US Road
- Municipal Boundary
- City/Village Limits
- Water



beginning of this section). While the majority of residents, 80.1%, are aware of their home connection speed, this leaves 19.9% of respondents with an Internet connection who are not aware of the speed at which they connect.

Areas of the county struggling with connectivity include the Townships of Tyrone, Sparta, Grattan, Vergennes, Lowell, Bowne, Gaines, Caledonia, Byron, Cascade, Algoma, and Ada.

Residential Connections by Speed Tier



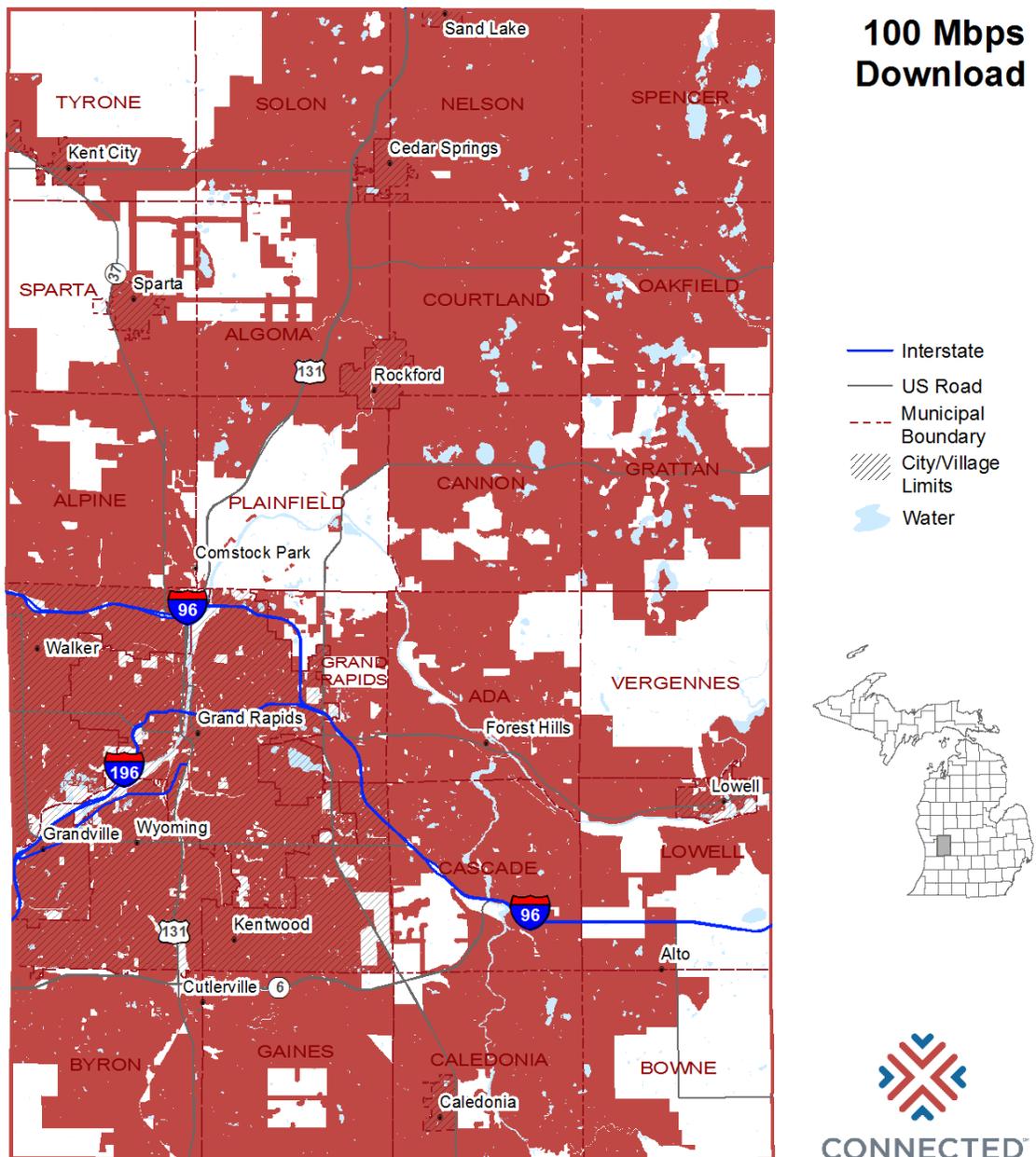
High Speed Broadband Availability

While the Internet connection speed of 25 Mbps download and 3 Mbps upload is the FCC's current definition of "advanced broadband service," this definition must be considered temporary. In 2009, the definition of a broadband connection was 768 Kilobits per second download and 200 Kilobits per second upload. Four years later, in 2013, the FCC revised its definition again to 4 Mbps download and 1 Mbps upload. This moving target will continue to move upward as residents, businesses, and institutions continue to demand more of their Internet connections, and new bandwidth-intensive applications are developed. Trying to future-proof the definition of broadband is impossible, but by examining the availability of higher connection speeds, areas in need of intervention can be identified early.

High-speed broadband availability is measured by analyzing the percentage of homes in the community that have access to fixed broadband speeds of at least 100 Mbps download. In 2015 Kent County had 232,961 households. Of

these, 90.6% had access to broadband of at least 100 Mbps download.

The map of High Speed Broadband Availability provided shows areas with and without broadband service at this speed (areas in white are those without such service). Five broadband providers offer service with a download speed of at least 100 Mbps: Charter Communications, Comcast, Casair, Inc., LightSpeed Communications, and Vergennes Broadband. Casair, Lightspeed, and Vergennes offer residential broadband connections up to 1 Gbps.



Broadband Competition

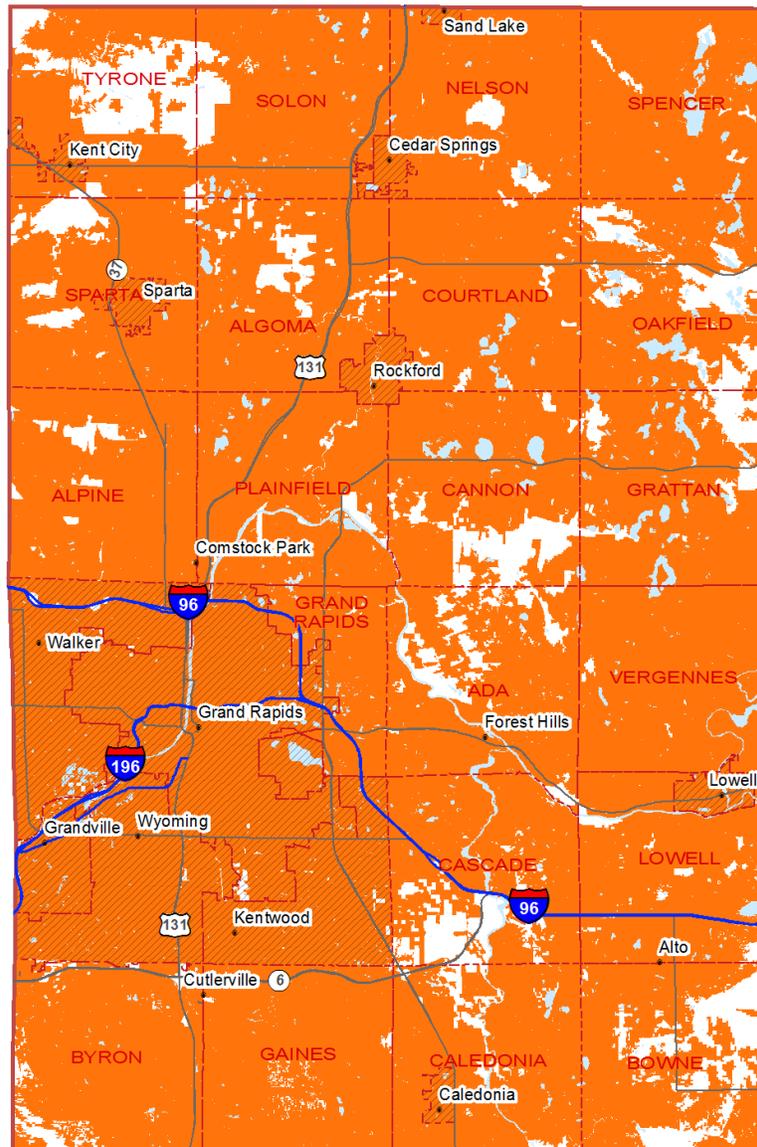
In the majority of communities, broadband service is a private-sector industry. Internet connectivity can be delivered via several technology platforms including cable, DSL, fixed wireless, mobile wireless, fiber, and satellite. Companies offering service via these platforms often compete with each other in areas with high household density, but that competition can wane as household density decreases in rural areas. Because broadband service typically responds to market forces, competition impacts the cost of broadband service. Therefore, in theory, the more ISPs available to a consumer, the lower the cost of service, (more information on broadband cost can be found in the Adoption/Affordability section of this plan).

Broadband competition is measured by analyzing the percentage of homes in the community that have access to two or more fixed, terrestrial broadband providers with service of at least 3 Mbps download and 768 Kbps upload (non-mobile and non-satellite). In 2015, Kent County had 232,961 households. Of these, 98.5% had access to an Internet connection from two or more providers. For comparison, across the state of Michigan approximately 92.9% of households have access to at least two ISPs.

“Competition between broadband services enables consumer alternatives, helps to lower costs, improves services, and induces broadband providers to upgrade their networks. By encouraging competition in communities, communities will benefit directly through the expanded services and competitive prices,” said Tom Wheeler, past chair of the Federal Communications Commission. The map of Broadband Competition provided shows areas with and without access to multiple carriers

(areas in white are those without access to two or more providers). Kent County is served by 22 unique broadband providers, some of which offer service on multiple technology platforms. The list of carriers, their technology platform, end users, and website are included on the next page.

Competition provides residents and businesses with choices for service allowing them the ability to switch providers if their current service does not meet their needs. According to the Residential Survey, 41.1% of households with a broadband connection state that their current Internet service does not meet their needs, (see chart on following page). Among residents who state that their connection does not meet their needs, 73.4% indicated that the speed was too slow, and 66.2% stated that the cost was too high.



More than One Fixed Broadband Provider (≥ 3 Mbps/ 768 Kbps)

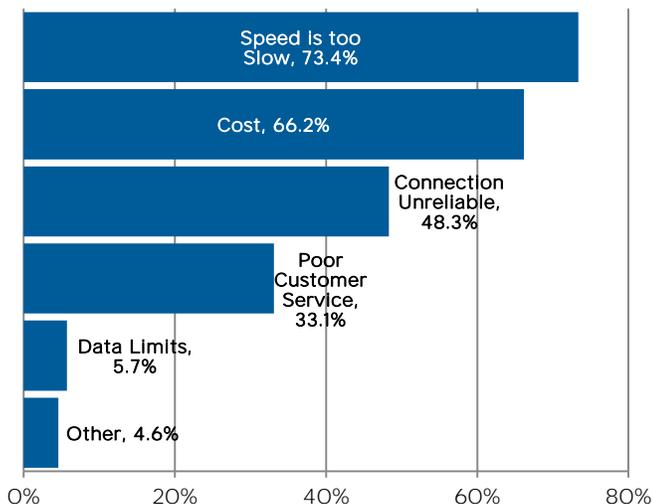
- Interstate
- US Road
- Municipal Boundary
- City/Village Limits
- Water



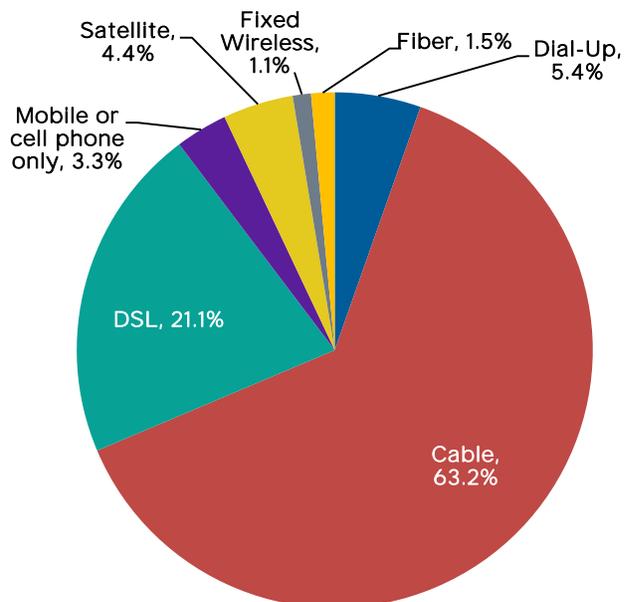
Kent County Broadband Providers

Kent County Broadband Providers			
Provider Name	Platform	Website	Max. Advertised Download Speed (Mbps)
Charter Communications Inc.	Cable	http://www.charter.com	100
Comcast	Cable	http://www.xfinity.com	105
WOW!	Cable	http://www.wowway.com	15
ACD.net	DSL	http://www.acd.net	20
AT&T Michigan	DSL	http://www.att.com/local/michigan/	45
Cavalier Telephone	DSL	http://www.windstream.com	6
Global Capacity LLC	DSL	https://globalcapacity.com	6
I-2000, Inc.	DSL	http://www.i2k.net	24
Iserv	DSL	http://www.iserv.net	10
JAS Networks	DSL	http://www.jasnetworks.net	10
MegaPath Corporation	DSL	https://www.megapath.com	6
AT&T Michigan	Fiber	http://www.att.com/local/michigan/	45
Casair, Inc.	Fiber	http://www.casair.net	1000
LightSpeed Communications	Fiber	http://www.golightspeed.com	1000
Vergennes Broadband LLC	Fiber	https://vergennesbroadband.com	1000
Azulstar, Inc.	Fixed Wireless	http://www.azulstar.com	6
Casair, Inc.	Fixed Wireless	http://www.casair.net	10
FreedomNet Solutions	Fixed Wireless	http://freedomnet.com	10
MEI Telecom	Fixed Wireless	http://mei.net	6
Michwave Technologies, Inc.	Fixed Wireless	http://www.michwave.com	20
NCATS	Fixed Wireless	http://www.ncats.net	20
Stratos Networks	Fixed Wireless	http://www.stratospeed.com	10
Vergennes Broadband LLC	Fixed Wireless	https://vergennesbroadband.com	10
West Michigan Broadband	Fixed Wireless	http://www.westmichiganbroadband.com	8
AT&T Mobility	Mobile Wireless	https://www.att.com/shop/wireless.html	10
Sprint	Mobile Wireless	http://www.sprint.com	15
T-Mobile	Mobile Wireless	http://www.t-mobile.com	10
Verizon Wireless	Mobile Wireless	http://www.verizonwireless.com	12

Reason for Dissatisfaction With Current Broadband Connection
**Respondents could choose more than one reason*



Connections by Technology



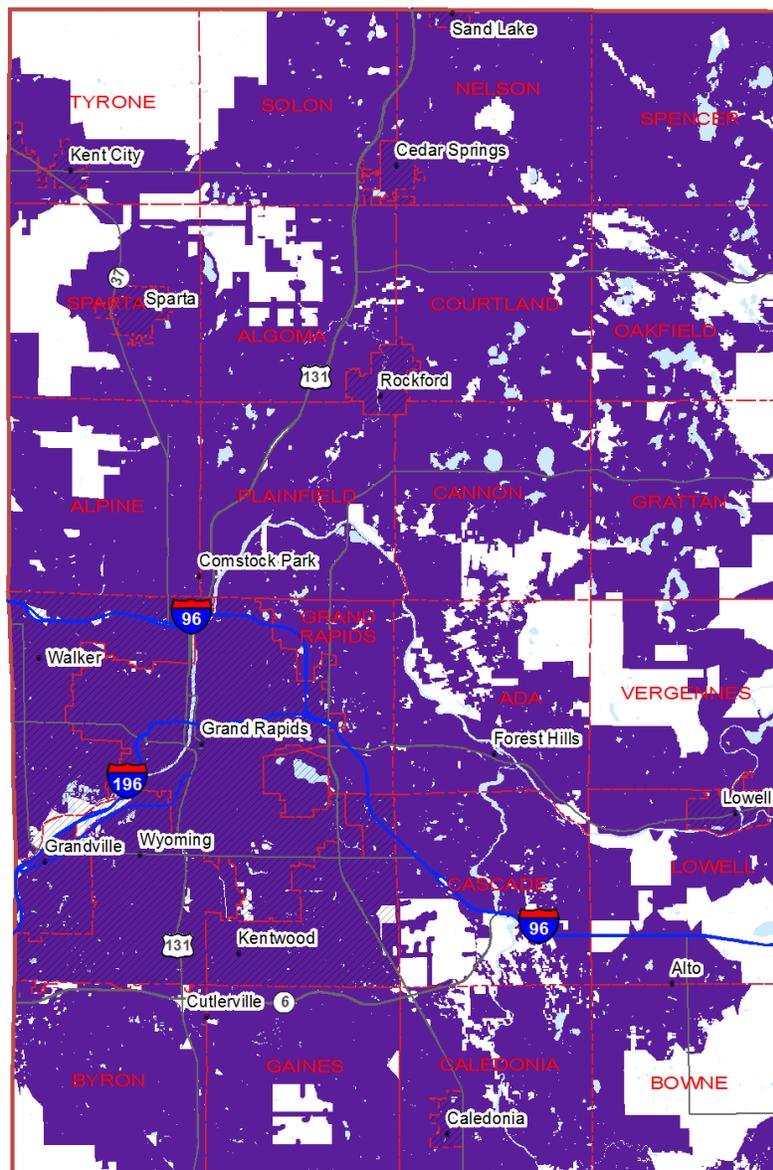
Platform Dependency

The Broadband Competition metric examines how many households have access to two or more ISPs, while the Platform Dependency metric looks at how many households have access to two or more technology types to which they can subscribe. It is important to ensure that households not only have access to multiple ISPs, but also have access to different technology types to meet their needs. Technology choice allows greater flexibility for households looking to find the right company, but also the right speed and connection reliability that meets their needs.

Broadband platform (or type) dependency is measured by analyzing the percentage of homes in the community that have access to two or more fixed broadband technology types with service of at least 3 Mbps download and 768 Kbps upload. In 2015, Kent County had 232,961 households. Of these, 97.5% had access to an Internet connection from two or more technology platform types. The map of Platform Dependency provided shows areas with and without access to multiple technologies (areas in white are those without access to two or more technologies).

The examination of broadband technology platform dependency is similar to that of the analysis of broadband provider competition. Technology platforms included in this analysis include cable, DSL, fixed wireless, and fiber-optic (all of

which are fixed, terrestrial platforms). Differing technology platforms offer different features and speeds that appeal to the various needs of households. Kent County has three cable providers, eight DSL providers, nine fixed wireless providers, and four fiber providers that offer residential service. Often times DSL providers do not overlap each other, (similarly, cable providers also do not overlap each other), but DSL and cable networks do overlap one another. Fixed wireless service is often found in more rural areas where the deployment of wired options is cost prohibitive, but it does overlap wired coverage in some areas. Most community residents connect via a cable (63.2%) or DSL (21.1%) network, (see chart on previous page).



**More than
One Fixed
Broadband
Type
(≥ 3 Mbps/
768 Kbps)**

- Interstate
- US Road
- Municipal Boundary
- City/Village Limits
- Water

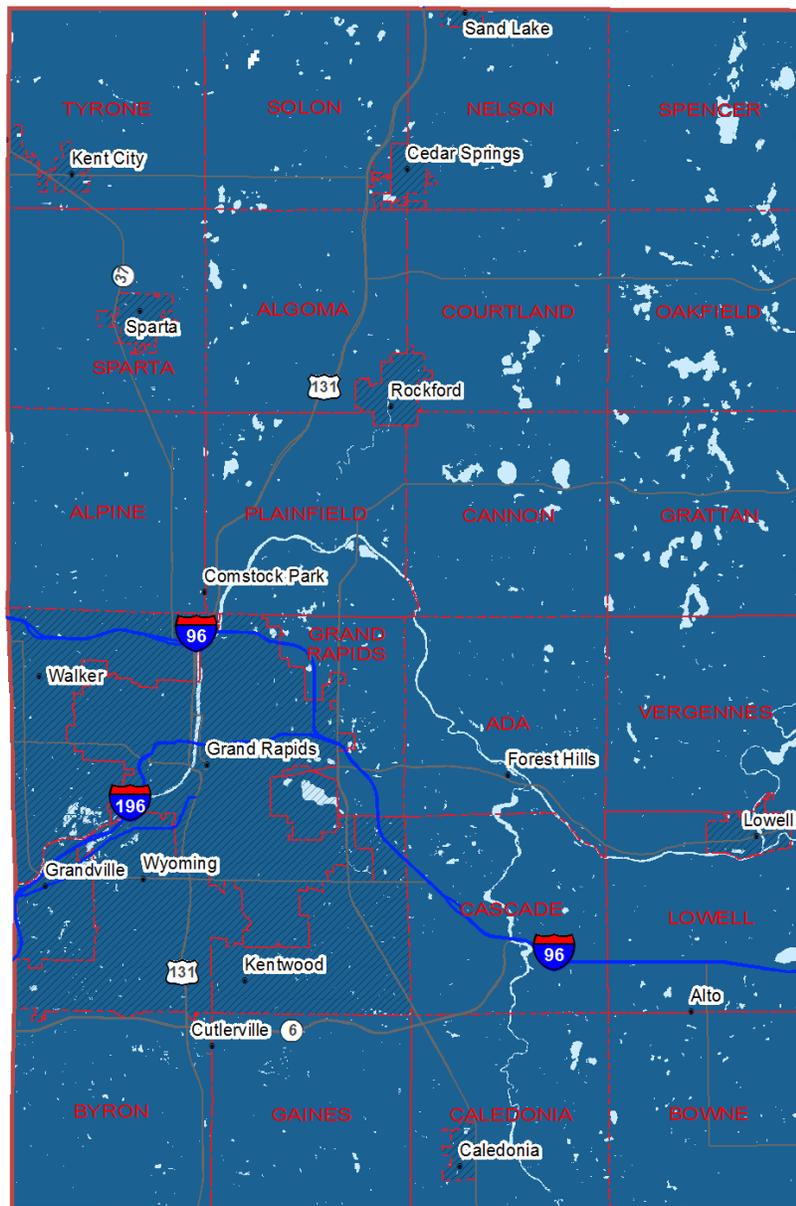


Mobile Broadband Availability

Mobile broadband is the technology that connects mobile, or cellular, phones to the Internet. Mobile technology is designed to operate seamlessly as one moves about either in a car or otherwise. Mobile broadband is not considered in any of the previous Access metrics as those metrics are concerned with stationary broadband connections for homes, while mobile is just that—mobile, flexible, and dynamic. For this reason, mobile broadband availability is measured not by percent of households with availability, but by geographic area of the community. There are several factors that can impact the quality and availability of a mobile broadband signal including terrain, elevation, vegetation, man-made structures, weather, and large bodies of water. While some of these features have been considered when mapping and analyzing mobile access, local conditions in the community can greatly impact on-the-ground results. Mobile broadband is critical for not only consumers, but for public safety as well.

Mobile broadband is becoming increasingly important to local economies, government services, public safety and utility organizations, as well as local residents. Robust mobile broadband service is key to the development of infrastructural upgrades, such as smart grid and other utility efficiencies, and unlocks unlimited opportunities for business development, as well as support for educational, healthcare, and government services.

Mobile broadband availability is measured by examining the percent of geographic area of the community with access to mobile broadband from at least two mobile providers at speeds of at least 10 Mbps download and 1.5 Mbps upload. Kent County has a total land area of 871 square miles. As of September 2016, approximately 99.9% of this land area had access to two or more mobile broadband providers at 10 Mbps download and 1.5 Mbps upload. Kent County is served by four mobile broadband providers that serve at least some area of the community. The map of Mobile Broadband provided shows areas with and without access to mobile broadband, (areas in white are those without access to such services).



Mobile Broadband from at Least Two Carriers (≥ 10 Mbps/ 1.5 Mbps)

- Interstate
- US Road
- - - Municipal Boundary
- ▨ City/Village Limits
- Water



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Middle Mile Infrastructure

The term “middle mile” refers to segments of the telecommunications network that provide a link between local or “last mile” networks and the global network of Internet users and servers. Middle mile is critical for communities as it provides the necessary data transport from local users to the broader Internet. Middle mile infrastructure is typically made-up of fiber-optic cable, although microwave technology can also be used to support middle mile connectivity. A lack of middle mile infrastructure in a community can impact the availability and cost of last mile connections to residents, businesses, and institutions.

Middle mile infrastructure is measured by comparing the known linear miles of fiber in the community to the linear miles of roadway in the community. Middle mile fiber infrastructure is typically installed within the right-of-way along public roads. By comparing the length of public right-of-way in the community to the length of fiber, an estimate of the community’s middle mile “density” can be established. Kent County has approximately 4,935.4 miles of public roads. According to the Michigan METRO Authority, in 2013, there were approximately 6,119.5 miles of fiber optic infrastructure within the rights-of-way of Kent County.

Linear Miles of Fiber and Total Road Miles by Municipality in Kent County			
Municipality	Total Road Miles	Total Fiber Miles	Fiber to Road Ratio
Total Kent County	4935.43	6,119.50	1.24
City of Cedar Springs	22.51	21.90	0.97
City of East Grand Rapids	51.17	67.55	1.32
City of Grand Rapids	760.87	1,106.33	1.45
City of Grandville	95.79	127.15	1.33
City of Kentwood	213.3	347.74	1.63
City of Lowell	33.87	113.29	3.34
City of Rockford	33.07	49.75	1.50
City of Walker	191.36	217.48	1.14
City of Wyoming	316.55	454.19	1.43
Township of Ada	168.4	202.94	1.21
Township of Algoma	161.42	224.29	1.39
Township of Alpine	135.59	145.10	1.07
Township of Bowne	96.82	92.22	0.95
Township of Byron	201.94	227.44	1.13
Township of Caledonia	165.78	235.42	1.42
Township of Cannon	170.2	231.33	1.36
Township of Cascade	212.36	262.01	1.23
Township of Courtland	117.85	137.38	1.17
Township of Gaines	185.19	264.08	1.43
Township of Grand Rapids	142.53	169.38	1.19
Township of Grattan	108.75	108.51	1.00
Township of Lowell	122.31	135.73	1.11
Township of Nelson	126.5	95.31	0.75
Township of Oakfield	134.21	137.78	1.03
Township of Plainfield	277.82	332.48	1.20
Township of Solon	122.85	151.89	1.24
Township of Sparta	135.29	99.61	0.74
Township of Spencer	126.19	122.82	0.97
Township of Tyrone	122.86	71.55	0.58
Township of Vergennes	117.83	99.91	0.85
Village of Caledonia	12.98	14.82	1.14
Village of Casnovia	2.94	2.82	0.96
Village of Kent City	13.18	11.37	0.86
Village of Sand Lake	8.77	7.06	0.80
Village of Sparta	26.38	30.88	1.17

Fiber Carriers in Kent County	
AT&T Corp.	MCImetro Access
AT&T Michigan	McLeod USA
Broadwing	Merit Network
Charter	Qwest
Comcast	Sprint
Consumers Energy	TDS Metro com
CTel Fiber	Telnet Worldwide
Frontier North	US Signal
Great Lakes Comnet	WilTel
Level 3	Windstream Norlight
Local Exchange Carriers	

While the length of fiber is greater than the length of roadway, this does not indicate that fiber is available along every road in the county. Often times multiple providers will locate fiber along the same stretch of right-of-way. This is particularly true in more densely populated areas of the community that have service from a greater number of broadband providers.

The table shows the total road miles and total fiber miles in each of Kent County’s municipalities. Additionally, the table below provides a list of known fiber providers in the county. This table is not an exhaustive list of fiber providers in the

community, only those that provided information to the Michigan Metro Authority. There may be additional public and private sector fiber networks in the community.

Adoption

Broadband adoption is a different issue from broadband access. While access refers to one's physical connection to the Internet, broadband adoption is the choice made by a resident, business, or institution to embrace and use broadband and its related technologies. Broadband adoption cannot occur without having access to high-speed infrastructure; however, even with access to the Internet, broadband adoption may not follow.

Several studies have shown that even with access to broadband, residents, businesses, and institutions may not adopt. Barriers to adoption can often include cost (of either a device used to connect or the cost of the connection itself), lack of relevance to the user, or lack of digital literacy (knowledge and skills associated with the use of digital hardware or software). Lack of broadband infrastructure availability is also cited as a barrier.

The broadband adoption gap (the difference between the number of entities with access to broadband and the number of those same entities that use it), can increase or decrease depending on the demographics of a community. For example, low-income populations have lower adoption rates than those with higher incomes. This same disparity can be found between age cohorts, physical locations, employment status, educational levels, etc. Regardless of socioeconomic status, demographic composition, or geographic location, however, every person should have the opportunity to participate in the digital economy.

The study of broadband access can be viewed as a fairly quantitative analysis, while the examination of broadband adoption is a qualitative, human-centric study. There are several factors that contribute to the study of broadband adoption, but no consistent dataset exists that allows communities to examine local barriers to adoption in detail. In order to gather this information, the Kent County Broadband Advisory Committee deployed the Connected Residential Technology Survey throughout the community. The survey is designed to gather detailed information on the adoption and use of broadband and technology among residents of the community. The survey, distributed in the summer and fall of 2016, gathered 900 responses. This return rate provides for an analysis into local issues and barriers preventing residents from leveraging technology to improve quality of life.

The Adoption focus area of the Connected assessment examines several areas of adoption in order to form a comprehensive view of the technology landscape in the community. While each metric has a single

Adoption Highlights

45,194

Households that do not subscribe to Internet service

47.6%

Households without Internet citing cost as the main barrier

\$61.65

Average monthly cost of Internet service

367

Public computers available in the county

Groups with low rates of broadband adoption

- ✓ Adults without a degree
- ✓ Adults aged 65+
- ✓ Retired adults
- ✓ Households without K-12-aged children
- ✓ Military households
- ✓ Households with income less than \$50k

identifying variable for scoring, the following pages provide deeper insight into each metric to help identify underlying issues that can be remedied through strategic project implementation. The following areas related to broadband adoption are measured and reported: home adoption, affordability, digital literacy, public computer availability, and frequency of Internet use.

Adoption Assessment Score Summary		
Metric	Community Points	Possible Points
Home Broadband Adoption	8	10
Affordability	8	10
Digital Literacy - Hardware	8	10
Digital Literacy - Software	6	10
Digital Literacy - Online Activity	8	10
Public Computer Availability	6	10
Frequency of Internet Use	10	10
Total	54	70

Home Broadband Adoption

The adoption of home Internet service is the single most critical step for families to experience the benefits of being connected to the digital economy. Adoption represents the choice families make to be connected or not. There are several factors that influence broadband adoption. Sometimes these factors are internal and influenced by behavior patterns and knowledge (e.g., digital literacy skill, awareness of benefits, etc.); other times these factors are external and the adopter has little or no control over them (e.g., cost and infrastructure availability). Adoption often follows broadband availability, but not always. With more and more services being conducted in an online environment and an increased desire to digitally communicate, those without a home broadband connection most often seek connections elsewhere, breaking the *access-first-adoption-second* pattern.

Home Broadband Adoption looks at the percent of the community's population that subscribes to (adopts) Internet service. In 2015, Kent County had 232,961 households. According to the Residential Technology Survey, 80.6% of households in the community subscribed to Internet service with a broadband connection at home. While this statistic provides a macro-level look at adoption in the community, additional survey questions allow for a deeper analysis of adoption in order to find the demographic or socioeconomic groups struggling with digital inclusion.

For comparison, the United States American Community Survey estimates that 75.1% of households across the country have an Internet connection. Across Michigan, this figure is slightly higher at 78.8% of households.

Home Broadband Adoption – Digital Divide

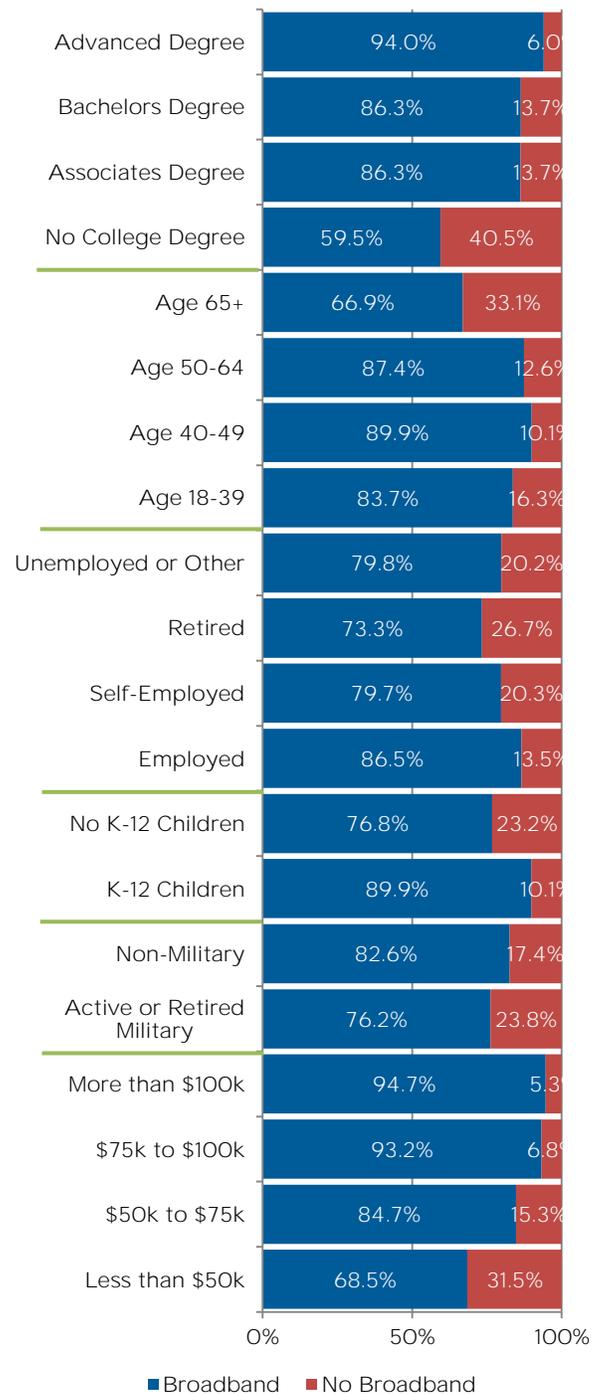
These charts provide insight into Home Broadband Adoption for various demographic groups in the community. From this data, the following observations can be made regarding those on the wrong side of the digital divide in Kent County:

- Households earning less than \$50,000 annually are significantly less likely to adopt an Internet connection at home compared to households earning more. This is consistent with national and state trends.
- Somewhat inconsistent with state and national averages, adults aged 18-34 in Kent County are slightly less likely to adopt broadband than their older neighbors.
- than those without students in the K-12 system. Broadband is often a necessity for students to listen to lectures and complete assignments.
- Households with active or retired military are less likely to have a home broadband connection than their non-military counterparts.
- While there are differences in adoption rates by employment status, the only group with a rate well below the community average (80.6%) is retirees.

However, only two-thirds of residents aged 65 and older have a home connection.

- Adults without a college degree are less likely to adopt a home broadband connection than those with a two-year, four-year, or advanced degree.
- Households with school-aged children are more likely to have a broadband connection

Broadband Adoption for Various Groups



Home Broadband Adoption – Barriers

Once the broadband adoption rates for various socioeconomic and demographic groups have been identified, the next important step is to examine the barriers to broadband adoption among them. This analysis examines groups of current non-adopters and the barriers they face: 1) households earning less than \$50,000 annually; 2) adults with no college degree; 3) adults aged 65 and older; 4) retired adults; 5) households without K-12 children; and 6) military households. The chart at right shows the percent of households in each group that indicated their primary barrier to having a home Internet connection.

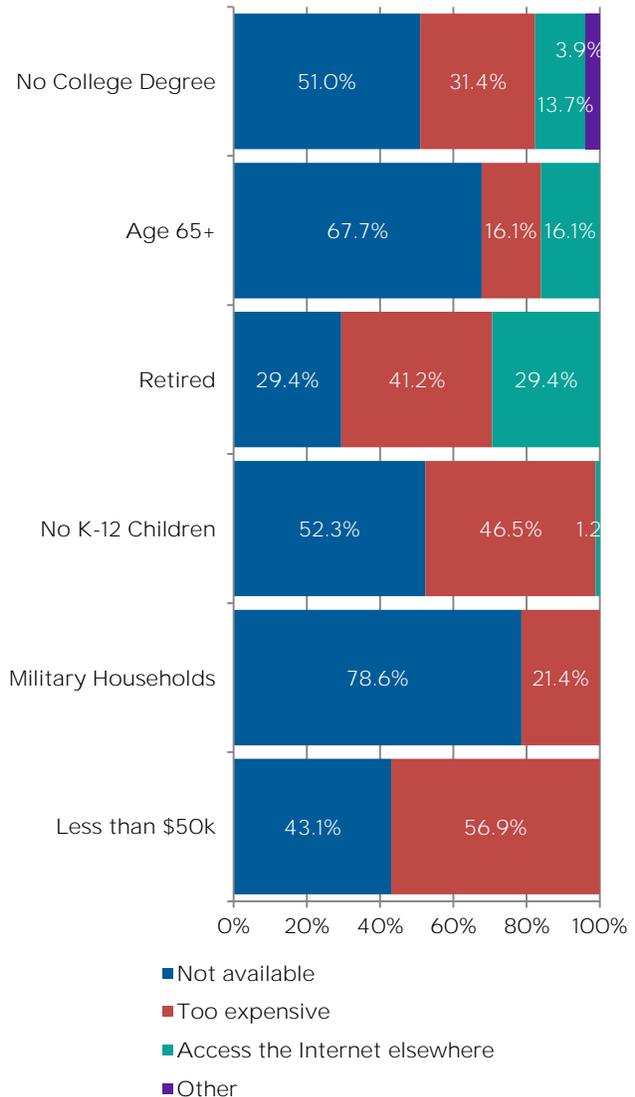
Across Kent County, the primary barrier preventing home broadband adoption is a lack of infrastructure. Among all households without a home Internet connection, 49.5% cite a lack of availability as the primary barrier. This is also reflected in three of the four groups featured in the chart on the right. Adults 65 and older, adults without a college degree, and military households cite a lack of availability as the primary barrier to adoption. This indicates that if infrastructure were available, these groups would likely adopt. This barrier is also cited by other groups, but it is not their primary barrier.

The cost of a home Internet connection is the second most oft cited barrier to adoption. Among all non-adopting residents, 47.6% say that a home Internet connection is too expensive. This sentiment is reflected with many of the groups in the chart. The cost of service is the primary barrier for households earning less than \$50,000, annually, and is the second most common barrier for households without K-12-aged children, retired adults, and adults with no college degree.

Retired residents are more likely than other groups to cite that they access the Internet some place other than home, as are those 65 and older and those with no college degree.

The residential survey included other barriers to adoption including; “don’t know enough about the Internet to feel comfortable using it;” “do not own a computer;” “dissatisfied with current Internet choices,” and “do not need the Internet.” No survey respondents indicated these reasons as their primary barrier to broadband adoption.

Barriers to Broadband Adoption Among Various Groups



Affordability

The Affordability metric examines one of the primary barriers to broadband and technology adoption. The cost of having an Internet connection can stem from several sources including the monthly cost of service, installation and equipment costs in order to obtain service, and the cost of an Internet-enabled device (e.g., computer, tablet, smart phone, etc.). These costs can be a burden for families with lower incomes and thus the choice to connect is controlled by the external cost of service for these households. This disconnection can leave families on the wrong side of the digital divide.

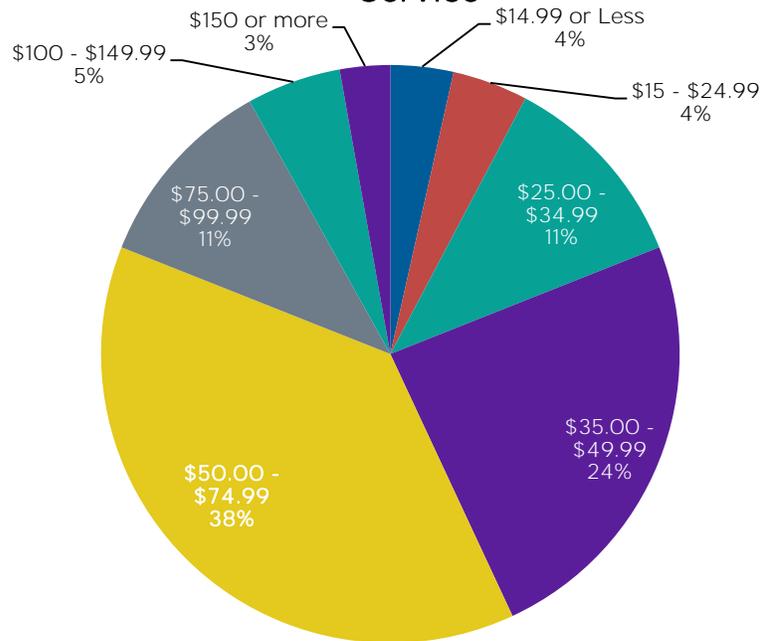
The affordability metric compares the average cost of residential Internet service in the community to the average cost in the state and nation as a whole. In 2015, the national average monthly subscription cost for Internet service was \$71.71. In Kent County, this cost was \$61.65, approximately 86% of the national average. Subscription price information was gathered from seventeen residential providers that offer a total of 82 subscription packages and the national average is from data gathered by the FCC.

The first chart shows the distribution of reported costs from the residential survey. Most households report paying less than \$75 per month for broadband service.

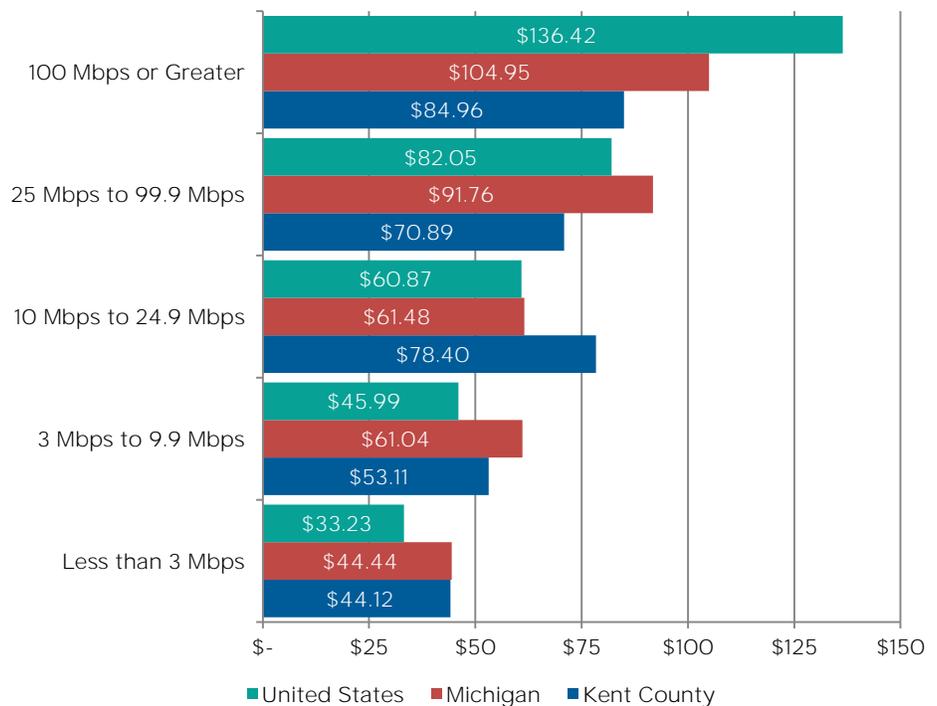
As shown in the second chart, the cost of broadband service across Kent County is less than the national average for speeds greater than 25 Mbps, but costs tend to be higher for broadband service with speeds less than 25 Mbps, particularly for service between 10 Mbps and 25 Mbps.

While the costs of Internet service are generally less than the national average, cost is still a significant barrier to the adoption of technology by many in the community. Of the current non-adopting households in the

Reported Monthly Cost of Residential Service



Average Cost of Broadband Service by Speed Tier



community, 47.6% cite the price of service as the primary barrier to subscribing at home.

Digital Literacy

Digital literacy is the “ability to use information and communication technologies to find, evaluate, create, and communicate information, requiring both cognitive and technical skills.” This definition of digital literacy from the American Library Association succinctly describes the goals of measuring and improving the digital literacy in a community. Technology skills are critical for competing in the global, digital economy.

The digital literacy metric examines three areas of technology skills: those associated with hardware, software, and online activity and communications.

Respondents to the Residential Technology Survey were asked to assess their own technology skills among several devices, applications, and activities within each of the three digital literacy areas on the following scale:

0 = No Experience (“I need to learn.”)

1 = Basic Skill (“I know a little about this technology.”)

2 = Intermediate Skill (“I’m very comfortable using this technology.”)

3 = Advanced Skill (“I could teach this technology to someone else.”)

N/I = Not Interested (“I’m not interested in this technology.”)

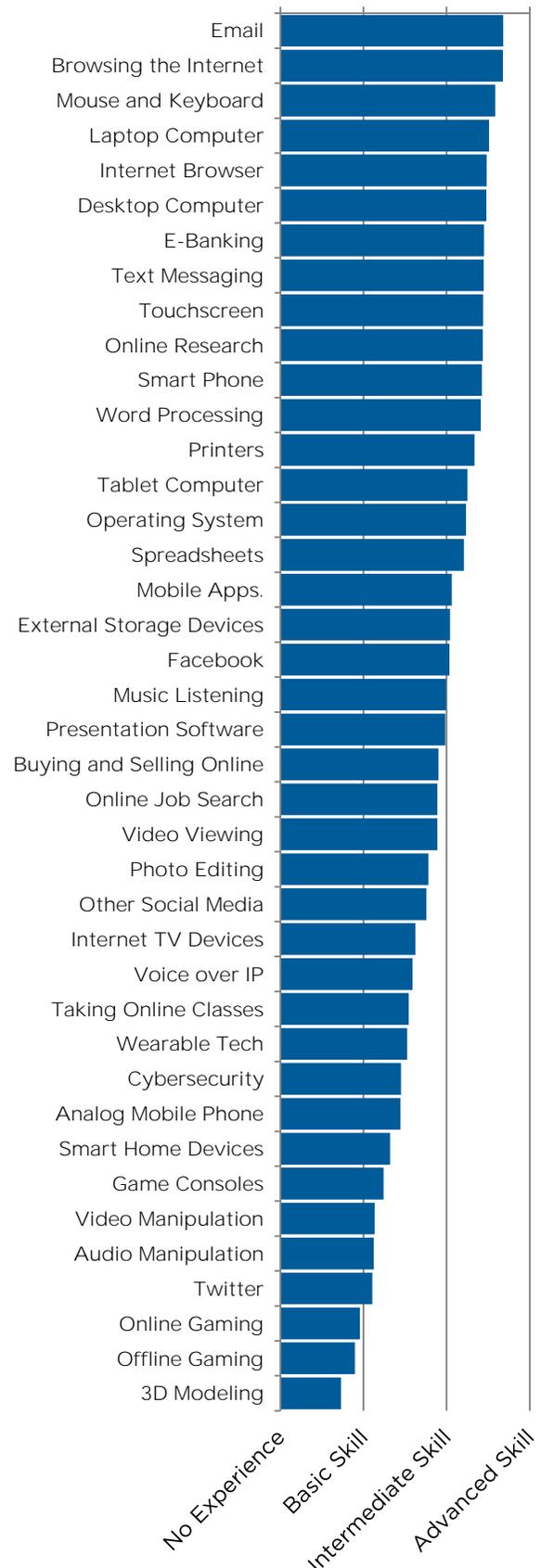
Among all residents in the community, the average score for Hardware Digital Literacy was 2.02, the average score for Software was 1.74 and for Online Activity, 1.93.

According to the self-assessed results from survey respondents, average digital literacy tends to decline with age, increase with income, and increase but plateau with higher levels of educational attainment.

Below are a few notes of interest regarding digital literacy in the community:

- Approximately 44% of residents stated that they “know a little about” or “need to learn” about staying safe online. Knowledge of cybersecurity drops significantly with age.
- Overall, residents are quite comfortable with the three basic types of computers (i.e., desktop, laptop, and tablet), with an average skill rating of 2.41 across all three devices.
- Knowledge of both smart mobile phones and analog mobile phones tends to decline with age.
- Residents are significantly more comfortable with Facebook than they are with Twitter or other social media platforms, (avg. rating of 2.03, 1.11, and 1.76, respectively).
- Even though a large portion of residents are not proficient with cybersecurity, they are proficient with conducting online banking and bill payment, an activity typically fraught with opportunities for identity exposure or fraud. More than 90% of residents say they are comfortable with e-banking or could teach it to others.

Average Digital Literacy by Application or Device



Public Computers

The expense associated with home computer ownership represents a significant barrier to broadband adoption. For low-income residents without the ability to purchase a home computer (or other device), a public computer center may be their only opportunity to access the Internet. Further, public access to technology is necessary for community members who have little or no communication technology available in the home, need assistance to effectively use technology, or need to supplement connectivity at home or in schools.

A community should have sufficient, free access to computers, Internet, wireless networks, and other communication technologies to support the needs of residents. In addition, public computer centers should be located in safe facilities, with adequate levels of privacy, security, and accessibility for people with disabilities. Information regarding the availability and location of public computer centers should be widely disseminated.

The Public Computers metric examines the ratio of public computers per 1,000 people in the community. Data gathered from the Libraries and Community Organizations Survey identified 367 public computers for use within the community across 21 locations. In 2015, the population in Kent County was 624,984. The ratio of public computers per 1,000 people in the community is 0.58.

The table provides a list of locations and the number of Internet-enabled public computers available for use. Additionally, all library and community organizations offer free Wi-Fi access to the public. Libraries and organizations also were asked to indicate the three groups that comprise the majority of public computer users. Adults aged 19 to 54 were cited most frequently, closely followed by adults over the age of 55. Those seeking jobs, low-income patrons, and students were also cited as common users of public computers. These groups are not mutually exclusive and may overlap.

Additionally, the Residential Technology Survey asks residents who don't have a home Internet subscription the location where they do access the Internet. The following table shows the locations from which non-adopting residents access the Internet.

Most non-adopting residents (52.4%) access the Internet from their place of employment. A mobile device is another popular way to access the Internet for those without a fixed permanent

connection at home. Coffee shops or restaurants are the third most popular location with 30.5% accessing the Internet from these places. Nearly one-quarter (21.9%) of non-adopting households access the Internet from a library.

Public Computer Locations	
Location	# of Public Computers
Grand Rapids Public Library	60
Kent District Library (KDL) - Walker Branch	9
KDL - Gaines Twp. Branch	16
KDL - Alto Branch	4
WKTU Community Media	7
All other KDL Branches Combined	271
Total	367

Locations Non-Adopters Access the Internet	
Location	Non-Adopting Residents
Place of Employment	52.4%
Library	21.9%
Coffee Shop or Restaurant	30.5%
Friend or Family Member's Home	10.5%
School	18.1%
Mobile device	51.4%
<i>Respondents could choose more than one location</i>	

Frequency of Internet Use

The Internet has moved from an occasional tool to one of the principal ways we communicate, perform research, work, or participate in leisure activities. Measuring the frequency of Internet use among community residents allows a glimpse into the importance of the Internet in their lives. More importantly, this analysis can identify the common traits among those who use the Internet less frequently and develop solutions for including them in the digital ecosystem.

The Frequency of Internet Use metric is calculated by finding the average frequency with which survey respondents state they access the Internet. For Kent County the majority of residents access the Internet either constantly throughout the day or at least several times each day.

While it appears that the community as a whole uses the Internet on a daily basis, further examination of certain groups within the community reveals disparities.

Frequency of Internet access tends to increase with household income. Similarly, frequency of Internet access tends to slow as age increases. For example, among adults aged 65 and older, 39.5% state they constantly access the Internet throughout the day,

Frequency of Internet Use by Select Groups					
Group	Constantly	Daily	Weekly	Monthly or Less	Never
Age					
18-39	78.8%	21.2%	-	-	-
30-49	70.9%	27.0%	2.1%	-	-
50-64	56.1%	43.1%	0.8%	-	-
65 or Older	39.5%	59.7%	0.8%	-	-
Income					
Less than \$50K	52.0%	47.4%	0.6%	-	-
\$50K to Less than \$75K	55.2%	43.4%	1.4%	-	-
\$75K to Less than \$100K	67.2%	32.8%	-	-	-
Greater than \$100K	65.6%	33.9%	0.5%	-	-
Military					
Active or Retired Military	31.4%	68.6%	-	-	-
Non-Military	61.0%	38.1%	0.8%	-	-
K-12 Households					
Homes with K-12 Children	69.1%	30.9%	-	-	-
No K-12 Children Present	52.7%	46.3%	1.0%	-	-

compared to 78.8% that do so among adults aged 18 to 39. Additionally, households with active or retired military tend to access the Internet less frequently than non-military households.

While frequency of Internet use is a personal choice, for those completely without or with restricted access to the network, those who cannot afford a connection, those without the skills to use the Internet, and those with limited awareness of the opportunities afforded by the Internet, their opportunity to make such a personal choice is severely limited.

Use

The access and adoption of broadband and Internet technologies leads to the use of that connection and applications to improve the quality of life of a community. Technology impacts every sector of our economy and opportunities abound for residents, businesses, and institutions to leverage technology to make improvements in their day-to-day lives and operations.

The wellbeing of a community involves the complex interaction of several sectors including healthcare, K-12 and higher education, public safety, government, libraries, residents, private-sector businesses, and others. These distinct, yet entwined, sectors (and their many individual parts and entities) contribute to that community's place in the digital economy. As broadband and related technology have developed over time, applications pertinent to each of these sectors have been developed that allow them to function, provide services, generate revenue, and generally operate more efficiently, which impacts their contribution to the community. The use of broadband and technology is critical to the impact these sectors have on the overall wellbeing of a community.

Recognizing the importance of technology for every part of a community, the Connected assessment examines the use of broadband among these many sectors. Recognizing that every

Use Highlights

21.9%

Adults without home Internet accessing the web at libraries

0.76

Internet-enabled devices per student across the community

100%

K-12 schools with both a parent and student online portal

62%

Municipalities with a social media presence

70%

Higher education curriculum delivered in an online format

community is different and may want to focus on areas that are more pertinent than others, communities choose at least three Use sections for analysis, (in addition to the Libraries/Community Organizations focus area, which is required). The Kent County Broadband Advisory Committee has chosen to examine the Government, Higher Education, and K-12 Education sectors.

Use Assessment Score Summary		
Use Area	Community Points	Possible Points
Government	24	40
Higher Education	26	40
K-12 Education	23	40
Libraries and Community Organizations	34	40
Total	107	160

Use/Libraries and Community Organizations

Libraries and other community organizations serve a vital role in providing access to information and technology for the entire community. Libraries often host public computers with Internet access for those without a device or connection at home, and also provide various types of technology training to develop a more digitally literate community.

The Libraries and Community Organizations Use section comprises six different metrics. Data for these metrics is derived from the Libraries and Community Organizations Survey that was distributed to entities throughout the community, as well as from the Residential Technology Survey. In Kent County, survey responses were received from seven libraries in the community. One community organization also responded.

The following libraries and community organizations submitted a response to the survey: Grand Rapids Public Library, the Grandville, Walker, Gaines Twp., Alto, Englehardt, and Service Center branches of the Kent District Library, and WKTV Community Media.

The Libraries and Community Organizations Use metrics include broadband adoption, website use, training, advanced technology use, frequency of digital communication, and community awareness.

Use/Libraries & Community Organizations Highlights

21.9%

Adults without home Internet accessing the web at libraries

100%

Libraries offering free Wi-Fi to the public

6

Avg. number of tech. training programs offered at each library

0%

Libraries with connections meeting the FCC goal of 1 Gbps

36.8%

Residents interacting with libraries at least weekly

Use/Libraries and Community Organizations Assessment Score Summary		
Use Area	Community Points	Possible Points
Broadband Adoption	5	5
Website Use	5	5
Training	8	10
Advanced Use	10	10
Frequency of Digital Communication	3	5
Community Awareness	3	5
Total	34	40

Broadband Adoption

The Broadband Adoption metric measures the number of libraries with Internet service. Each of the responding entities indicates a broadband connection of at least 50 Mbps. Three libraries, Alto, Englehardt, and the KDL Service Center report an Internet connection of at least 500 Mbps. Additionally, all libraries and organizations report offering free Wi-Fi connections to the public in addition to public computer access (see Public Computers section of this plan).

While every library in the community has an Internet connection, no library in the community currently meets the goal of 1 gigabit per second broadband established by the Federal Communications Commission in the National Broadband Plan.

Website Use

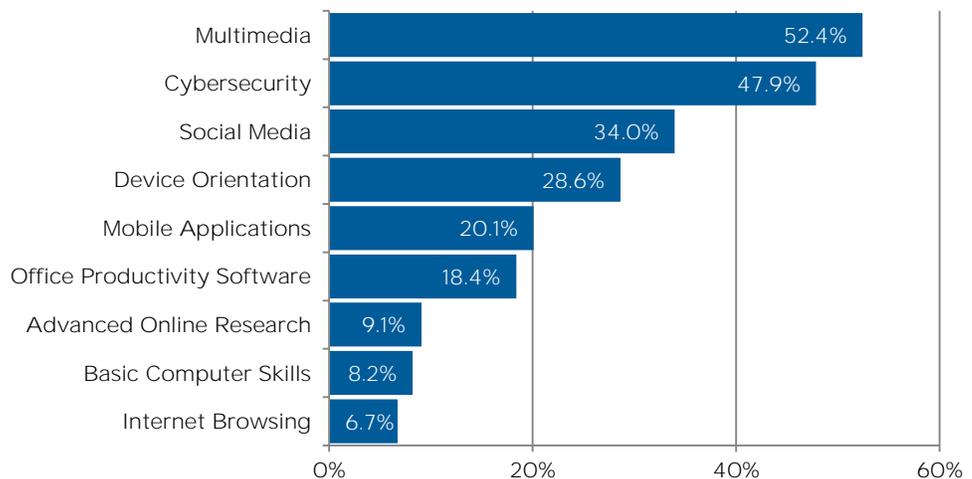
The Website Use metric measures the number of libraries with a website. All of the responding libraries and organizations have a website. Additionally, all entities implement advanced website features, with an average of 10 of 11 features used across all respondents. Advanced features include: Calendar of events, staff-accessible content management system, contact information accessible from homepage, integration with social media accounts, integrated search function, links to relevant and related organizations, login for clients/patrons/staff, newsfeed for current updates, organization leadership and contact information, stated privacy policy, online feedback mechanism, and the ability to conduct transactions online, (e.g., bill payment, registration, etc.).

Training

Libraries and community organizations provide opportunities for digital literacy training outside of

Library Locations and Training Opportunities Offered						
Training Opportunities	Grand Rapids Public Library	KDL – Walker	KDL – Gaines Twp.	KDL – Alto	WKTU Community Media	KDL – Service Center
Basic computer skills	X	X	X	X		X
Coding and program/app. development						X
Cyber-safety		X				
Device orientation		X	X			X
Internet browsing and searching	X	X	X	X	X	X
Advanced online research			X			X
Mobile device applications		X	X			X
Multimedia		X			X	X
Office productivity software	X	X		X	X	X
Social media	X	X	X	X	X	X
Technology for businesses	X					X
Website development						

Percent of Residents Indicating They "Need to Learn" or "Know Little About" Various Technology Applications and Devices



a traditional classroom setting within a facility dedicated to accessing information. The average number of training programs per location is 6.

The Kent District Library Service Center and Walker Branch offer the most diverse array of technology training. The Walker location is the only facility indicating a cyber-safety training program. Additionally, the KDL Service Center is the only branch offering coding and program or application

development. No library or organization offers website development training.

An examination of the self-reported digital literacy skills of specific applications and devices provides guidance for expanding technology training programs in the community. The applications and devices included in the analysis of digital literacy can be translated into the types of training programs offered at community libraries. The chart provides a glimpse into the skill needs of the community's residents.

The chart shows the percent of residents responding to the survey that indicated they "need to learn" or "know little about" the selected technologies. As shown, respondents were least familiar with multimedia applications (52.4%) and cybersecurity (47.9%), while most were comfortable with basic computer skills (8.2%) and browsing the Internet (6.7%). Nearly one-fifth (18.4%) of residents indicated that they need to learn or only know a little about office productivity software, applications that are often critical to on-the-job success in most occupations. These skill gaps can be aligned with the training currently offered within the libraries, and promotion and development can make these trainings more effective.

Advanced Use

The Advanced Use metric examines the implementation, or planned implementation, of several more advanced uses of technology within the community's libraries and organizations. The table describes each of these advanced uses along with the number of libraries/organizations that currently use each technology, the number that plan to implement the technology, and

Locations Using, Planning to Implement, or Not Interested in Advanced Applications			
Advanced Use/Application	Currently In Use	Planning to Implement	Not Interested
Patrons/clients can access critical information online	5	1	-
All staff have e-mail accounts	6	-	-
Organization offers meeting facilities with technology	5	-	1
Digitizes local community information	5	-	1
Utilizes electronic system to manage resources	6	-	-
Organization maintains local listserv or e-mail list	6	-	-
Websites and/or web portals are mobile compatible	6	-	-
Uses adaptive technology for patrons/clients	3	1	-
Voice-over Internet Protocol (VoIP) phone service	5	-	-

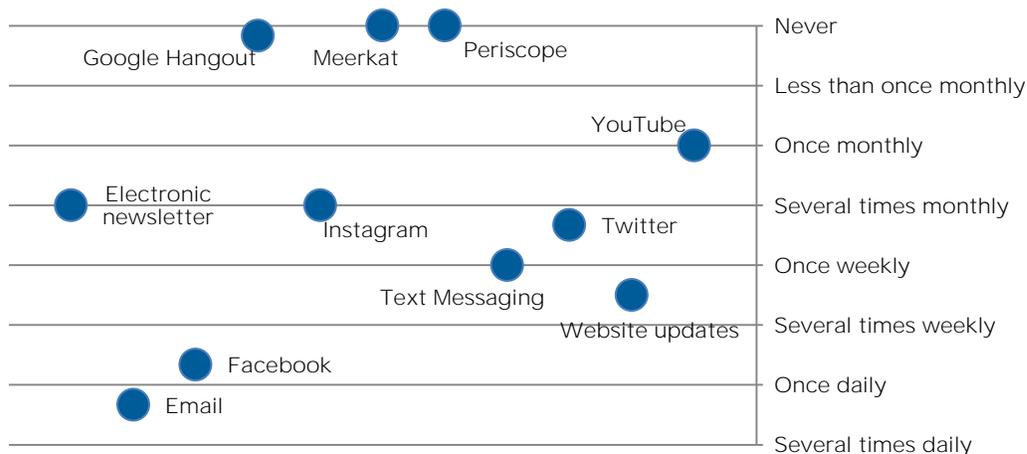
those not interested in the technology. As shown in the table, there is a mix of current implementation, those planning to do so, and those not interested in the various technologies. Most libraries and organizations have already implemented the advanced technology applications or plan to do so. Only a small minor are not interested in the applications.

Frequency of Digital Communication

Technology coupled with an Internet connection provides a myriad of ways to digitally interact with the world or even those in one's own community. The Frequency of Digital Communication metric examines how often libraries and community organizations are leveraging digital tools and social media to inform, interact with, serve, and receive feedback from patrons/clients and the community. Survey results indicate that on, average, libraries and organizations in the community are using digital tools to communicate an average of once per month.

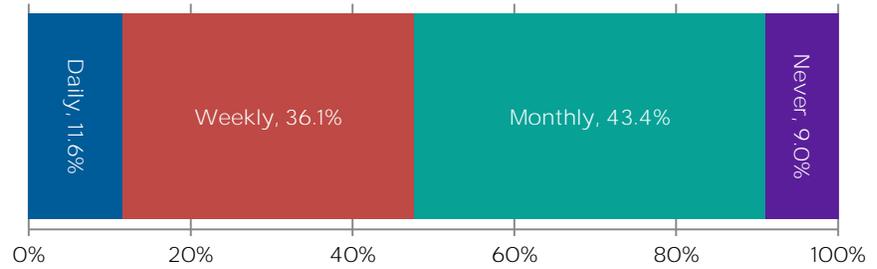
The chart shows the average frequency of use for

Average Use of Digital Communications Tools Among Libraries and Community Organizations

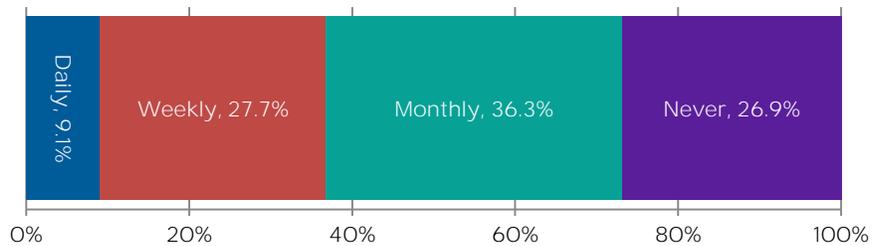


each of the digital communications tools included in the survey. Email, Facebook, and Website Updates are the three most commonly used digital communications tools among libraries and organizations in the community. Text messaging, Twitter, Instagram, and electronic newsletters comprise the next most popular tools. Video-based social media (Google Hangout, Meerkat, and Periscope) are rarely if ever used, and YouTube is used by only two entities, but is done so daily.

Frequency of Resident Digital Interaction with Community Organizations



Frequency of Resident Digital Interaction with Libraries



Community Awareness

The Community Awareness metric measures the frequency with which residents state they digitally interact with libraries and community organizations. This metric can be thought of as the inverse of the analysis of digital communication tools used by libraries and organizations. Respondents of the Residential Technology Survey were asked to indicate the regularity with which they access online information from or interact electronically with libraries.

Survey results indicate that residents interact electronically with libraries slightly more often than once per month. The chart provides a distribution of the various responses among survey respondents. While most residents (73.1%) say they interact with libraries with some frequency, 26.9% of residents indicate they never electronically interact with libraries. Those aged 65 and older tend to digitally interact with libraries more frequently than other age groups with 32.3% stating

they do so at least weekly. Households with annual incomes less than \$75,000 also indicate more frequent interaction with libraries, as do households with K-12 aged children.

Additionally, residents were asked to indicate the frequency with which they digitally interact with community organizations. Residents interact with various community organizations more frequently than they interact with libraries, (47.7% doing so weekly compared to 36.8% for libraries).

Use/K-12 Education

K-12 Institutions are the cornerstone of a community's educational system. K-12 education provides students with the knowledge and opportunity to become productive members of the next generation workforce. Schools, along with libraries, have traditionally been early adopters of new technologies, not only as the subject of education but also as tools. For this analysis, the Connected assessment is focused on the way in which Internet-enabled devices and applications are tools for enhancing the learning environment and providing students with opportunities beyond the classroom. Additionally, the assessment examines the use of technology that allows schools to more effectively communicate with parents, students, and the community at large.

The K-12 Education Use section comprises seven different metrics. Data for these metrics is derived from the K-12 Education Survey that was distributed to institutions throughout the community, as well as from the Residential Technology Survey. Ten public schools districts, one private school district, and four individual schools responded to the K-12 survey: Byron Center Public Schools, Caledonia Community Schools, Forest Hills Public Schools, Godfrey-Lee Public Schools, Kelloggsville Public Schools, Kent Intermediate School District, Kentwood Public Schools, Rockford Public Schools, Tri-County Area Schools, Grandville, Calvin Christian Schools, Kenowa Hills High School, Northview High School, Ottawa Hills High School, and South Christian High School.

Use/K-12 Education Highlights

49.2%

K-12 curriculum delivered with web-enabled technology

10.1%

Households w/children without a home Internet connection

47.6%

Households w/kids, but without Internet, that never digitally interact with K-12 schools

6

Surveyed schools with Internet speeds of 500 Mbps or more

0.76

Internet-enabled devices per student across the community

100%

K-12 schools with both a parent and student online portal

The K-12 Education Use metrics include: electronic content delivery, advanced website use, frequency of digital communication, community awareness, student/parent engagement, one-to-one device implementation, and device to student ratio.

Use/K-12 Education Assessment Score Summary		
Use Area	Community Points	Possible Points
Electronic Content Delivery	3	5
Advanced Website Use	4	5
Student Parent/Engagement	5	5
One-to-One Device Implementation	2	10
Device-to-Student Ratio	2	5
Frequency of Digital Communication	3	5
Community Awareness	4	5
Total	23	40

K-12 Overview

Apart from the analysis of the specific K-12 Education Use metrics (which focus on the use of technology by the schools themselves), the

Connected assessment gathers information from the Residential Technology Survey that is pertinent to the discussion of technology for students. Below are several charts that examine the access, adoption, and use of home Internet connections for households with K-12 aged children. If schools are working to place an Internet-enabled device into the hands of every student, an Internet connection at home is critical to fulfill its intended purpose, which is to leverage technology beyond the classroom for expanded educational opportunities.

According to survey results, all responding schools indicate a fiber-optic broadband connection with speeds between 25 Mbps and 5 Gbps. Providers of these fiber connections vary widely between schools, but are all served by private sector companies. Additionally, all public and private schools, with the exception of Ottawa Hills High School, indicate that Wi-Fi connectivity is available in 100% of classrooms.

An analysis of K-12 technology adoption and use is not complete, however, without a discussion of the technology and connectivity available to K-12 students at home. The need for technology and an Internet connection at home increases as the use of technology increases in the classroom. Technology in education is often lauded as a great equalizer, allowing all students, regardless of socioeconomic status, to have equal access to resources and content. However, if a child lacks Internet connectivity at home, the divide between the technological haves and have nots is not reduced, but rather bolstered. In Kent County, approximately

Average Percent of Courses Delivered by Technology Type Across all School Districts	
Course Type	All Districts
Traditional – No online technology used	50.8%
Web-facilitated – uses web-based tech to facilitate a face-to-face course	26.7%
Blended – online and face-to-face delivery but with few physical meetings	15.0%
Online – all content delivered online, no face-to-face meetings	7.5%

10.1% of households with school-aged children do not have a home Internet connection.

Electronic Content Delivery

Technology enables new forms of educational content delivery. Between traditional classroom instruction and online-only classes lies a spectrum of web and technology-enabled methods of learning. The K-12 Education Survey gathered data from schools on the mixture of various intensities of technology-enabled instructional environments. Electronic Content Delivery measures the mixture of technology-facilitated instruction and content.

Across the community, the majority of schools in the community use traditional and web-facilitated curriculum delivery.

The use of various technologies in course delivery varies between districts. For example, 40% of courses at South Christian High School and 30% within Kent ISD use a blended curriculum delivery, while Kenowa Hills and Tri-County Area Schools tend to lean toward traditional and web-facilitated curriculum delivery. Eight schools/districts indicate that at least some of their curriculum is delivered in an entirely online environment.

Web-enabled K-12 course delivery offers new opportunities for learning as well as access to educational content outside of the classroom. However, this method of delivery also relies heavily on students' ability to connect to the Internet outside of school.

Connectivity Speed at Kent County Schools	
Download Speed	Number of Schools
25 Mbps to 100 Mbps	1
100 Mbps to 250 Mbps	1
250 Mbps to 500 Mbps	5
500 Mbps to 1 Gbps	5
1 Gbps to 5 Gbps	1

Advanced Website Use

A website is one of the most basic ways in which an institution establishes an online presence. Having robust, interactive, and communicative features on that website makes the user experience more efficient and impactful. The Advanced Website Use metric measures the average number of more advanced website features implemented across the websites of schools in the community. Eleven advanced website features were assessed.

For schools in Kent County, the average number of advanced website features in use among all school websites is 8.5 out of eleven assessed features. The table provides the three most commonly used and the three least commonly used advanced features across all K-12 schools.

Most Used and Unused Advanced Website Features			
% Using	Most Used Features	Most Unused Features	% Using
100%	Integrated Search Function	Stated Privacy Policy	66.7%
91.7%	Links to Relevant Organizations	Content Management	50.0%
91.7%	Organization Leadership Info	Transactional Functions	41.7%

Frequency of Digital Communication

Technology coupled with an Internet connection provides a myriad of ways to digitally interact with the world or even those in one's own community. The Frequency of Digital Communication metric examines how often K-12 institutions are leveraging digital tools and social media to inform, interact with, serve, and receive feedback from parents, students, and the community.

Survey responses indicate that K-12 Schools use digital tools to communicate with the public at least several times per month.

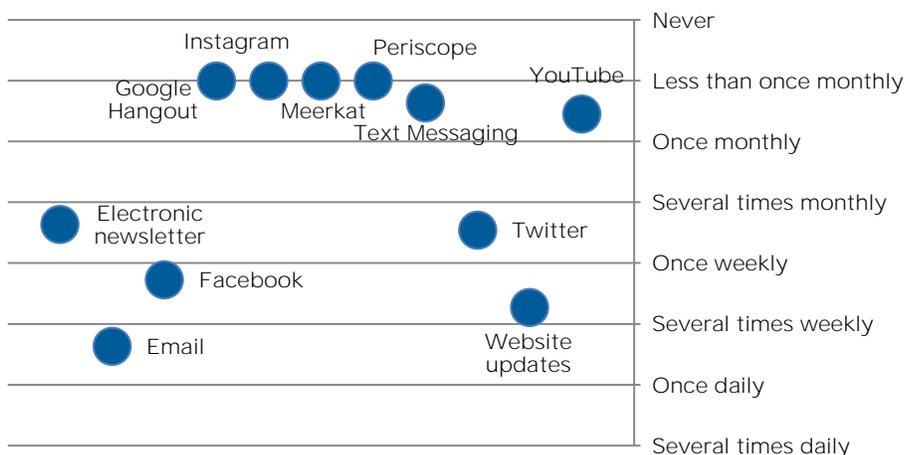
The chart shows the average frequency of use for each of the digital communications tools included in the survey.

As shown, some tools are used more frequently than others. E-mail, Facebook, and website updates are the most popular tools for communicating with parents and the public, while video-based platforms such as Google Hangouts, Meerkat, and Periscope are used less frequently. Twitter, Text Messaging, and Electronic Newsletters are also popular forms of digital communication. Frequency of use of social media (Facebook, Instagram, and Twitter) varies greatly by district. Ottawa Hills High School and Kentwood Public Schools are the most prolific users of social media, updating their platforms several times each week.

Student/Parent Engagement

One way to digitally engage parents and students is through an online portal where participants can access individualized information regarding school

Average Use of Digital Communications Tools Among K-12 Schools



performance, homework, activities, financial accounts, and much more.

The Student/Parent Engagement metric measures the presence of online student and/or parent portals across school districts in the community. Districts responding to the K-12 Education Technology Survey responded to the following two questions, 1) "Does the school have an online portal for students to access homework, educational content, and other information?" and 2) "Does the school have an online portal for parents to access grades, pay bills, register for activities, etc.?"

All schools responding to this question indicate that they have both a student and a parent online portal.

One-to-One Device Implementation

Many schools across the country are putting advanced computing power into the hands of every student. From tablets to laptops, Android to Apple, schools are examining opportunities for leveraging technology to expand opportunities for learning within and outside the classroom.

The One-to-One Device Implementation metric measures the implementation status of one device per student initiatives across the community. Schools responding to the K-12 Education Technology Survey were asked the question, “Does the school have a one-to-one device initiative or allow students to bring their own devices to school to access school-related and organized content and applications?” Respondents were asked to answer in a way that indicates their current stage of implementing a one-to-one program.

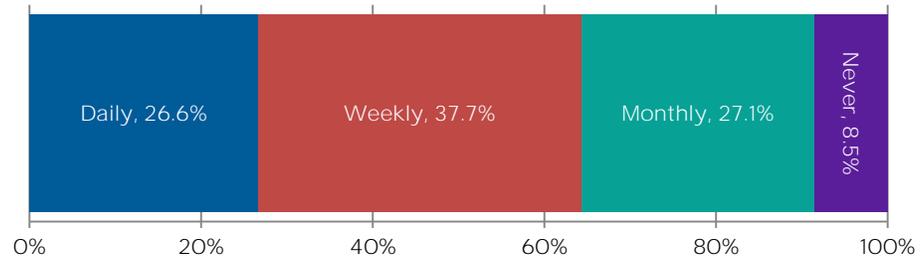
Six of the responding schools indicate they have successfully implemented a 1:1 device program: Grandville Calvin Christian Schools, Byron Center Public Schools, Caledonia Community Schools, Kent ISD, Kenowa Hills High School, and South Christian High School. Kentwood and Tri-County Schools are in the exploratory phase of implementing such a program, while Forest Hills Public Schools is currently in the pilot stage. Rockford Public Schools has an official plan for a 1:1 device program, and Godwin Heights, Kelloggsville, Northview High, and Ottawa Hills have no such program or plans to implement such an initiative.

Device to Student Ratio

This metric measures the ratio of Internet-enabled devices to students for the entire K-12 community. This metric is related to the one-to-one device program and is designed to identify places where technology is thinly spread among students in a community. One-to-one device programs allow all students to have individual access to technology, content, and resources; however, in communities without one-to-one device initiatives, technology is often shared in labs or individual classrooms among all students.

The device-to-student ratio is calculated by collecting the total number of devices and students from districts responding to the K-12 Education Technology Survey. Survey respondents indicate a total of 52,553 students along with a total 40,000 devices for an overall device-to-student ratio of

Frequency of Digital Interaction with K-12 Schools Among Households with Children



0.76. This indicates that, overall, there are fewer devices than students in the community.

Community Awareness

The Community Awareness metric measures the frequency with which residents with school-aged children state they digitally interact with K-12 schools. This metric can be thought of as the inverse of the analysis of digital communication tools used by schools. Respondents of the Residential Technology Survey were asked to indicate the regularity with which they access online information from or interact electronically with K-12 education. Survey results indicate that households with K-12 children interact electronically with K-12 schools several times each week.

The table provides a distribution of the various responses among residents. More than one-quarter of respondents (26.6%) have at least daily digital interaction with K-12 schools. Only 8.5% of respondents state they never electronically interact with K-12 schools.

Additionally, survey responses provide a glimpse into how frequently broadband adopting and non-adopting households with K-12 aged children are digitally interactive with K-12 schools. K-12 households without a home Internet connection digitally interact with K-12 schools far less frequently than those with a home connection. Approximately 4.5% of households with K-12 children with a broadband connection never digitally interact with K-12 schools, while nearly half (47.6%) K-12 households without a home Internet connection never digitally interact with schools.

Use/Government

Residents and businesses in a community are served by several local units of government. From municipalities such as cities, villages, and townships to counties, regional development groups, and others, communities comprise several overlapping jurisdictions, all with varying responsibilities. Internet connectivity, and related broadband-enabled applications, allows municipalities to take advantage of new and innovative ways to deliver existing or additional services to the public. E-government services allow citizens to conduct business and communicate with their local units of government more efficient and conveniently, allowing for great civic participation and effectual use of public resources.

The Government focus area has four metrics that measure the Use of broadband and related technologies among the local units of government within the community. There are 36 units of government within Kent County, including cities, villages, townships, and the county itself.

Surveys were distributed to all local units of government within the community. Of the 36 units identified, ten responded to the survey providing insight into their broadband access and use. These ten include Ada Township, Algoma Township, Alpine Township, City of East Grand Rapids, City of Grandville, Courtland Township, Gaines Township, Tyrone Township, Village of

Use/Government Highlights

7

Municipalities with download speeds greater than 50 Mbps

6.4/10

Average municipal website analysis score

11.9%

Residents who say they never digitally interact with local government

62%

Municipalities with a social media presence

Caledonia, and the Kent County Health Department. Metrics for the Government focus area include a website analysis, advanced website features, frequency of digital communication, and community awareness.

Use/Government Assessment Score Summary		
Use Area	Community Points	Possible Points
Website Analysis	6	10
Advanced Website Use	6	10
Frequency of Digital Communication	4	10
Community Awareness	8	10
Total	24	40

Government Connectivity

Just as with residents, businesses, and other institutions, the broadband connectivity available to and adopted by municipalities allows or limits the ability of that entity to offer e-government services to citizens. As the government connectivity table shows, connection speeds among municipalities range from 50 Mbps to 500 Mbps. Most municipalities are connected to a cable network. Additionally, Ada Township, City of East Grand Rapids, Gaines Township, Kent County Health Dept., and Tyrone Township offer free Wi-Fi to the public at their office.

Government Connectivity		
Municipality	Connection Download Speed	Connection Type
ADA TOWNSHIP	25 Mbps to 49.99 Mbps	DSL Internet
Algoma Township	100 Mbps to 499.99 Mbps	Cable Internet
Alpine Township	50 Mbps to 99.99 Mbps	Cable Internet
City of East Grand Rapids	100 Mbps to 499.99 Mbps	Cable Internet
City of Grandville	Unsure	Cable Internet
Courtland Township	Unsure	T1 Internet
Gaines Charter Township	50 Mbps to 99.99 Mbps	Cable Internet
Kent County Health Dept.	50 Mbps to 99.99 Mbps	Wireless Internet
Tyrone Township	50 Mbps to 99.99 Mbps	Cable Internet
Village of Caledonia	50 Mbps to 99.99 Mbps	Cable Internet

Website Analysis

The website of a local government may be the first point of contact a resident or business may have with the municipality when an issue arises or information is required. The websites of local governments, therefore, should provide relevant information for their citizens in an easily accessible and flexible digital environment.

The Website Analysis metric examines the accessibility, experience, marketing, and technology aspects of the websites of the community's local governments. This analysis is conducted using an online website analysis tool. The table provides the scores for each of the two websites tested. It should be noted that Ada Township and the Village of Ada share a website.

Below are links to the fully detailed report for each tested website. The reports detail the various aspects of every website with recommendations for improving the appearance, accessibility, and function of the site.

- Ada Twp: <http://bit.ly/2ipuNqD>
- Algoma Twp: <http://bit.ly/2ihXDua>

- Alpine Twp: <http://bit.ly/2ihZn6W>
- East Grand Rapids: <http://bit.ly/2jBIQlo>
- Grandville: <http://bit.ly/2iiOUKl>
- Courtland Twp: <http://bit.ly/2ipwHHv>
- Gaines Twp: <http://bit.ly/2joEOmi>
- Kent County: <http://bit.ly/2jcv2G7>
- Village of Caledonia: <http://bit.ly/2jJkOyi>

Advanced Website Use

A website is one of the most basic ways in which any institution establishes an online presence. Having robust, interactive, and communicative features on that website makes the user experience more efficient and impactful. The Advanced Website Use metric measures the average number of more advanced website features implemented across the websites of municipalities in the community. Eleven advanced website features were assessed. While the website analysis metric examines website structure and functionality, the advanced use metric examines best practices for an enhanced user experience. On average, municipalities implement between seven and eight of the eleven advanced features.

Municipal Website Analysis						
Municipality	URL	Access-ibility	Experience	Marketing	Technology	Overall
Ada Twp.	www.adamichigan.org	7.6	6.0	5.2	6.1	6.4
Algoma Twp.	www.algomatwp.org	6.6	3.8	6.2	3.6	5.3
Alpine Twp.	www.alpinetwp.org	7.5	5.3	5.4	5.1	6.9
East Grand Rapids	www.eastgr.org	7.5	5.5	6.2	4.8	6.7
Grandville	www.cityofgrandville.com	8.3	6.7	7.5	5.0	7.1
Courtland Twp.	www.courtlandtwp.org	8.9	6.7	6.3	5.9	7.2
Gaines Twp.	www.gainestownship.org	6.7	4.1	5.9	3.9	6.1
Kent County	www.accesskent.com	8.1	7.4	7.9	5.2	7.3
Village of Caledonia	www.villageofcaledonia.org	5.3	3.8	4.7	3.6	4.9

Advanced Website Features	% Using
General contact information available on homepage	100.0%
Links to relevant and related organizations	100.0%
Organization leadership and contact information	100.0%
Content management system (CMS) usable by organization staff	77.8%
Integrated search function	77.8%
Includes transactional functions	66.7%
Integrates with official social media accounts	55.6%
Newsfeed	55.6%
Login for staff/clients	33.3%

Township using it at least daily. Among other social media platforms, Instagram is never used and Twitter is only used by one municipality. Similarly, video-based tools (i.e., Google Hangouts, Meerkat, Periscope, and YouTube) are also never used.

Community Awareness

The Community Awareness metric measures the frequency with which residents state they digitally interact with local government. This metric can be thought of as the inverse of the analysis of digital communication tools used by each municipality. Respondents of the Residential Technology Survey were asked to indicate the regularity with which they access online information from or interact electronically with local government entities. Survey responses indicate that residents actively or passively interact electronically with local or county government on a monthly basis.

Expectedly, residents digitally interact more frequently with their local governments than with higher levels of organization. Nearly nine out of ten (88.1%) of residents interact electronically with local government with some frequency while only a small percentage report never doing so. Nearly a third of residents (30.3%) say they never interact with county government, while only 18.2% say they never interact with state government online. Residents aged 18 to 39 are more likely to interact digitally with local government than older residents.

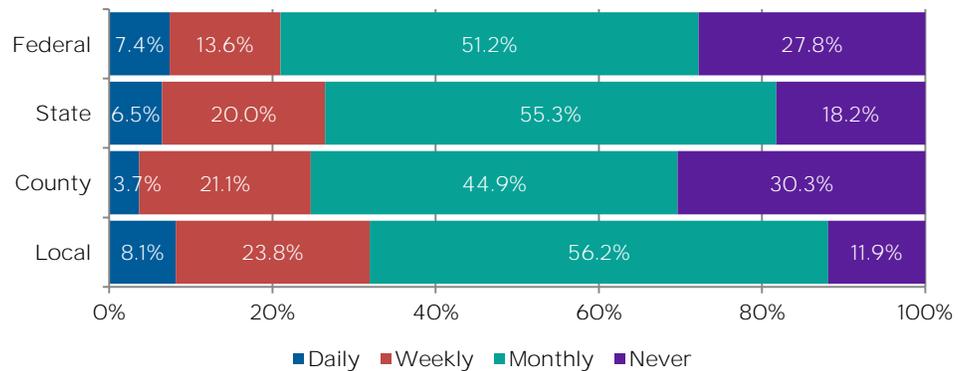
Frequency of Digital Communication

Digital communications tools are critical for municipalities to communicate with the public and encourage public participation in all matters of public interest. From public safety updates on social media to live video streaming of public meetings, there are a number of ways in which municipalities can digitally communicate with their citizens. This metric examines the use of digital communications tools by each municipality.

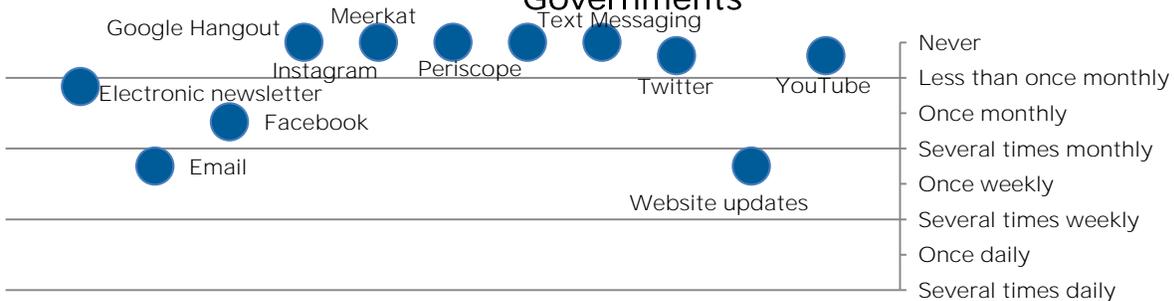
Survey responses indicate that municipalities in the county use digital tools to communicate with the public approximately once per month.

Digital communications tools vary widely in their use and applicability for municipalities. Among the eight responding municipalities, e-mail and website updates are the most commonly used digital communications tool (used weekly) followed by Facebook, which is the most commonly used social media platform among municipalities with Alpine

Frequency of Resident Digital Interaction with Various Levels of Government



Average Use of Digital Communications Tools Among Local Governments



Use/Higher Education

Post-secondary education contributes significantly to the talent and workforce development of a community. While the structure of K-12 education is relatively similar from one community to the next, higher education can take many forms. From community colleges and traditional universities to trade schools, higher education offers a variety of educational programs and content to meet the needs of the community. Higher education can also be an attractor for the community, drawing students and faculty from abroad. Similar to K-12 institutions, higher education has many opportunities to leverage Internet-enabled technologies to facilitate a more robust learning environment.

The Higher Education Use section comprises six different metrics. Data for these metrics is derived from the Higher Education Technology Survey that was distributed to institutions throughout the community, as well as from the Residential Technology Survey. In Kent County, survey responses were received from four higher education institutions including: Grand Valley State

Use/Higher Education Highlights

2/3

Institutions with Internet speeds of 500 Mbps or faster

70%

Higher education curriculum delivered in online format

1/3

Institutions offering degrees entirely online

41.1%

Residents digitally interacting with higher education weekly

University, Grand Rapids Community College, Kendall College of Art and Design, and Olivet Nazarene University.

The Higher Education metrics include: electronic content delivery, advanced website use, frequency of digital communication, wireless availability, online degrees, and community awareness.

Use/Higher Education Assessment Score Summary		
Use Area	Community Points	Possible Points
Electronic Content Delivery	6	10
Advanced Website Use	5	5
Frequency of Digital Communication	6	10
Wireless Availability	5	5
Online Degrees	1	5
Community Awareness	3	5
Total	26	40

Electronic Content Delivery

Technology enables new forms of educational content delivery. Between traditional classroom instruction and online-only classes lies a spectrum of web and technology-enabled methods of learning. The Higher Education Survey gathered data from community

institutions on the mixture of various intensities of technology-enabled instructional environments. Electronic Content Delivery measures the mixture of technology-facilitated instruction and content. In Kent County, higher education institutions use a mixture of traditional and web-facilitated curriculum delivery.

The table provides the distribution of technology-enabled course styles by institution. As shown, most institutions use a web-facilitated or traditional course style. Only Grand Rapids Community College offers courses in an entirely online environment.

Another method of delivering curriculum in an online environment is through the development of massive open online courses (MOOCs). A MOOC is a course of study made available over the Internet without charge to a very large number of people. MOOCs have gained popularity in higher education as a way to provide educational content to a global audience. Currently, no higher education institutions in the community offer MOOCs.

Advanced Website Use

A website is one of the most basic ways in which an institution establishes an online presence. Having robust, interactive, and communicative features on that website makes the user experience more efficient and impactful. The Advanced Website Use metric measures the average number of more advanced website features implemented across the

Distribution of Technology-Enabled Course Styles by Institution				
Institution Name	Traditional	Web-Facilitated	Blended	Online
Grand Valley State University	30%	60%	10%	0%
Grand Rapids Community College	50%	20%	10%	20%
Kendall College of Art and Design	10%	80%	10%	0%

websites for the community's higher education institutions. Twelve advanced website features were assessed.

For Kent County, the average number of advanced website features in use among institutional websites is eleven out of eleven. The advanced website features include: Calendar of events, staff-accessible content management system, contact information accessible from homepage, integration with social media accounts, integrated search function, links to relevant and related organizations, login for clients/patrons/staff, newsfeed for current updates, organization leadership and contact information, stated privacy policy, online feedback mechanism, and the ability to conduct transactions online, (payment, registration, etc.).

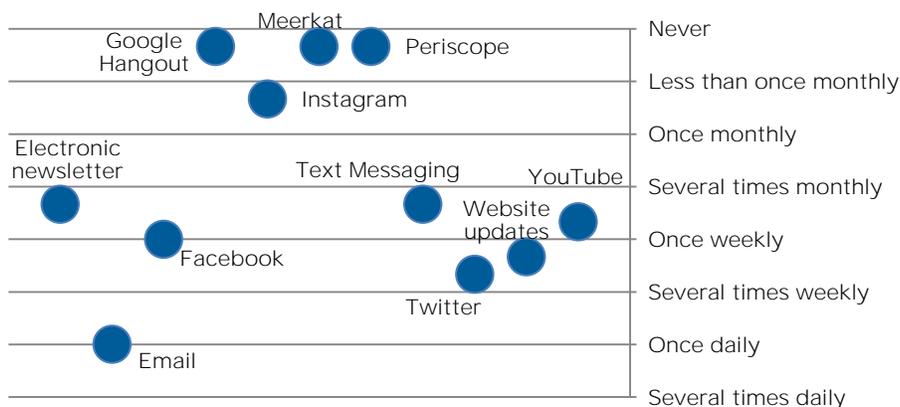
Frequency of Digital Communication

Technology coupled with an Internet connection provides a myriad of ways to digitally interact with the world or even those in one's own community. The Frequency of Digital Communication metric examines how often higher education institutions are leveraging digital tools and social media to inform, interact with, serve, and receive feedback from students, and the community.

Survey responses indicated that higher education institutions use digital tools to communicate with the public several times per month.

As shown in the chart, higher education institutions in the community use the popular social media platforms, Facebook, Twitter, and Instagram, with some frequency. E-mail and website updates are also used regularly while the video-based platforms, Google Hangouts, Meerkat, and Periscope are rarely used.

Average Use of Digital Communications Tools Among Higher Education Institutions



Wireless Availability

Wireless connectivity allows for a wide range of devices to be connected to the institution's network. While Wi-Fi is important in public and common areas, it is also important for Wi-Fi signals to penetrate into classrooms throughout campus.

The Wireless Availability metric measures the average classroom availability of Wi-Fi across the community's higher education institutions.

Nearly all classrooms on the campuses of the community's higher education institutions have Wi-Fi available for students and instructors. Only one institution indicated that Wi-Fi was available in less than 100% of their classrooms. However, only Grand Valley State University offers free Wi-Fi connectivity to the public on its campus.

Online Degrees

While the traditional higher education environment has stood the test of time as a format conducive to improving the knowledge, talent, and skills of students, a fluctuating global economy rooted in the production and transmission of information built on the backbone of the Internet requires more and flexible options for students to expand their skillsets. Occupations in the technology field, including even those outside the field that rely heavily on the use of technology, often require new and updated skills. To gain these skills, the workforce needs access to educational opportunities and credentialing that may or may not be located in their community. Online degrees and online educational programs offer this flexibility to local students and those from around the globe.

The Online Degrees metric examines the percent of the community's higher education institutions that offer degree programs entirely in an online environment without students ever being required to physically

attend or visit the campus. The Electronic Content Delivery metric measured the availability of courses delivered online, while this metric examines the availability of earning an entire degree in an online environment. Only Grand Rapids Community College offers degree programs entirely online.

Community Awareness

The Community Awareness metric measures the frequency with which residents state they digitally interact with higher education institutions or conduct continuing education activities. Respondents of the Residential Technology Survey were asked to indicate the regularity with which they access online information from or interact electronically with the higher education sector. Survey responses show that Kent County residents actively or passively interact electronically with the higher education sector several times per month or once per month.

The table provides a distribution of the various responses among residents. More than one-third (41%) of residents digitally interact with the higher education sector on at least a weekly basis, while nearly another third (31.9%) state they never interact with this sector online.

Additionally, 33.1% of community residents state that they "need to learn" or only "know a little about" taking online classes. This presents an opportunity for local higher educational institutions to build awareness for and promote their online course and degree offerings to the local community as a means to degree completion or simply continuing education.

Frequency of Resident Digital Interaction with Higher Education Institutions



CHALLENGES AND RECOMMENDATIONS

While Kent County exhibits great progress in broadband and technology advancement, this technology plan offers recommended actions that will help the community fill the technology gaps identified via the Connected assessment. These recommended actions for project implementation are subject to evolution as implementers assimilate various local organizational goals and objectives.

The plan recognizes the following projects currently in various stages of implementation and supports their continuation as they help to advance the state of broadband and related technologies in Kent County.

Priority Projects	
Continue to hold periodic Kent County Broadband meetings with a core group of community leaders and providers to address broadband-related concerns and support new projects.	Identify partnerships with broadband providers as appropriate to help address needs in local municipalities where broadband availability and speed is lacking. (See Access Recommendation: Develop Public-Private Partnerships to Deploy Broadband Service on page 44).
Share results of Residential Broadband Survey with local providers to raise awareness of availability and speed issues, and to help support business case for improvements. (See Access Recommendation: Perform a Broadband Build-Out Analysis on page 41).	Pursue Federal and State of Michigan assistance in enabling greater broadband expansion through funding, regulation or other actions. (See Access Recommendation: Develop Public-Private Partnerships to Deploy Broadband Service on page 44).
Keep surveys available for use by other Kent County municipalities, business sectors and organizations that desire more in depth assessment of their broadband needs. (See Access Recommendation: Perform a Broadband Build-Out Analysis on page 41).	

Challenges

The following table summarizes the broadband technology gaps and challenges in Kent County identified during the assessment.

Area	Challenge
Access	While many households in the county have access to broadband, many rural areas are still without service as defined by the FCC. Areas with infrastructure issues include: Tyrone, Sparta, Grattan, Vergennes, Lowell, Bowne, Gaines, Caledonia, Byron, Cascade, Algoma, and Ada Townships. While access to high-speed Internet is an issue in these areas, competition and platform dependency also contribute to a lack of access.
Adoption	Nearly 20% of households in the county do not subscribe to broadband service.
	Nearly half of non-adopting households (47.6%) cite cost as the primary barrier to having home Internet service.
Use	While digital literacy was not specifically cited by respondents as a barrier to broadband adoption, the self-assessed software digital literacy of the community is low.
	Libraries: Approximately 1/3 of residents digitally interact with libraries at least weekly, and libraries, on average, digitally communicate about once weekly on popular platforms.
	Libraries: Cybersecurity training is offered at one library, but nearly half of residents (47.9%) report that they need to learn more or currently know little about cybersecurity.
	K-12: Nearly half of households with children, but without Internet (47.6%), never digitally interact with schools. Approximately 10.1% of households with children do not have a home Internet connection.
	K-12: On average, there are approximately three Internet-enabled devices for every four K-12 students in the county. Some schools have not yet pursued the implementation of a one-to-one device program for students.
	K-12: Less than half of K-12 curriculum is delivered using web-facilitated technology
	Government: Many local government websites could use updates and modifications to improve functionality and usability.
	Government: Local governments are infrequent users of digital communications tools.
Higher Education: Only one of three responding institutions offers online degrees.	

The following pages contain recommended projects with details on their implementation that address the identified challenges. Projects are divided into those addressing Access, Adoption, and Use. Use recommendations are grouped by topic, (i.e., libraries, K-12 education, government, etc.).

Access Recommendations

Perform a Broadband Build-Out Analysis and Validate Demand for Broadband Service in Underserved Areas

GOAL: Determine the reasons why some areas of the community remain unserved, determine the feasibility of deploying various Internet systems in the defined area, and generate a business case for deployment.

DESCRIPTION: Perform an analysis of unserved areas to understand local assets and any barriers to broadband deployment. The local team should solicit feedback from residents of the unserved territory on their demand.

ACTIONS:

1. **Field Validation:** Conduct onsite visual assessments of the defined geographic areas unserved with broadband coverage. The assessment determines the feasibility of deploying various Internet systems in a defined area. Gather site specific information required for (i) determining use of existing infrastructure, (ii) designing wired and wireless Internet system using these assets, and (iii) expanding the broadband coverage in the defined area.
2. **Community Broadband Survey:** Use the results of the Residential Technology Survey to identify pockets of demand in areas without service. Survey results can also provide information on currently adopted speeds and costs. Stakeholders can also elect to perform a door-to-door survey of residents who live in neighborhoods in the unserved area to determine exact need, or in communities where more residential survey data is needed.
3. **Market Analysis:** A market analysis should also be performed to identify potential broadband providers, understand potential service offerings, and respective rates.
4. **Investment:** Results of the studies should be analyzed and released to providers to inform a business case for expansion or upgrades.
5. **Conversations:** Community broadband team members should include broadband providers in discussions of access expansion. Providers may have expansion plans that communities may not be aware of, or may be expanding infrastructure due to federal commitments, (e.g., Connect America Fund).

RESPONSIBLE PARTIES:

- County and local units of government with high number of underserved households
- Broadband providers
- Residents and businesses

RESOURCES:

- Guide to Federal funding for broadband projects: <http://bit.ly/1OJ1asb>.
- Fiber to the Home Council toolkit for communities looking to expand broadband infrastructure: <http://bit.ly/2d18QL6>.
- Pure Broadband builds access through cooperation: <http://bit.ly/2cCgzBk>.
- Building community broadband subscribership, from the University of Wisconsin: <http://bit.ly/2dCUUsX>.

BENEFITS:

1. Determines project feasibility and provides information to develop a business case for build-out.
2. First step in providing unserved community residents with adequate broadband access.
3. Fosters good relationships with public and private sectors.

Perform an Analysis of Local Policies and Ordinances

GOAL: Ensure that local policies and ordinances are conducive to wired and wireless broadband build-out.

DESCRIPTION: High capital investment costs, including permit processing, pole attachment costs, and lack of effective planning and coordination with public authorities, negatively impact the case for deployment. For example, the FCC's National Broadband Plan concludes that, "the rates, terms, and conditions for access to rights-of-way [including pole attachments] significantly impact broadband deployment." The costs associated with obtaining permits and leasing pole attachments and rights-of-way is one of the most expensive cost functions in a service provider's plans to expand or upgrade service, especially in rural markets where the ratio of poles to households goes off the charts. Furthermore, the process is time consuming. "Make ready" work, which involves moving wires and other equipment attached to a pole to ensure proper spacing between equipment and compliance with electric and safety codes, can take months to complete.

Community and provider collaboration to problem solve around local pole attachment and other right-of-way issues is one of the most effective opportunities to encourage faster, new deployment of infrastructure.

ACTIONS:

1. Speak with providers and determine barriers they face at a local and county level.
2. Review local policies, ordinances, and other barriers to broadband deployment and consult with community leaders, providers, utilities, and other members of the community to ensure that they are supporting policies (local ordinances, pole attachments, rights-of-way) that are conducive to broadband build-out.
3. Develop an awareness campaign targeting local government leaders to inform them of the benefits of broadband to the entire community.

RESPONSIBLE PARTIES:

- Local units of government, particular planning and zoning officials
- Broadband providers
- County government, particular road commissions
- Utility companies and pole owners
- Others with right-of-way jurisdiction

RESOURCES:

- Guide to best practices for reducing local barriers to broadband expansion: <http://bit.ly/2d42Jcm>.
- Cutting red tape for tower construction: <http://bit.ly/2d71GG4>.

BENEFITS:

1. Lowers cost barriers to improve the business case for broadband deployment.
2. Encourages good public policy and provider relations.

Study and Possibly Reassess Major Telecom Purchase Contracts to Stimulate Competition

GOAL: Leverage the demand for broadband across community institutions to promote competition and investment in broadband services.

DESCRIPTION: Competition is important as it enables consumers to find provider alternatives, which then helps to lower costs, improve services, and induce broadband providers to upgrade their networks. By encouraging competition, communities will benefit directly through the expanded services and competitive prices.

In addition to meeting with local providers listed in this report to encourage expansion into territories with one provider, the community should pursue other options to offer broadband service.

One of the most important tools that a community can use to drive competition is harnessing the demand for broadband capacity across community institutions to leverage their purchasing power. The purchasing power should be leveraged to help promote greater competition in the broadband market and drive increased investment in backhaul and last mile broadband capacity.

ACTIONS:

Develop partnerships between local high-capacity demand institutions, including local civic institutions, government entities, public safety agencies, libraries, hospital or clinics, and schools, in a coordinated effort to aggregate local demand needs for increased broadband capacity and service.

RESPONSIBLE PARTIES:

- Local units of government, including telecommunication commissions/boards and IT professionals
- Broadband providers
- Community anchor institutions
- Large businesses

RESOURCES:

- Broadband Competition and Innovation Policy: <http://www.broadband.gov/plan/4-broadband-competition-and-innovation-policy/>.
- The Importance of Telecommunications and Telecommunications Research: <https://www.nap.edu/read/11711/chapter/>

BENEFITS:

Demonstrates to interested broadband providers the existing pent-up demand and helps justify private investments to bring greater capacity backhaul service to the community.

Develop Public-Private Partnerships to Deploy Broadband Service

GOAL: Leverage existing community assets in partnership with private sector carriers to expand broadband network deployment.

DESCRIPTION: Public-private partnerships take many forms, limited only by the imagination and legal framework in which the municipality operates. Some communities issue municipal bonds to fund construction of a network, which they lease to private carriers, with the lease payments covering the debt service. Others create non-profit organizations to develop networks in collaboration with private carriers or provide seed investment to jumpstart construction of networks that the private sector is unable to cost-justify on its own.

A public-private partnership should not be simply seen as a method of financing. The strength of these partnerships is that each party brings something important to the table that the other doesn't have or can't easily acquire. The community can offer infrastructure (publicly owned building rooftops, light poles, towers, and other vertical assets for mounting infrastructure) for the deployment of a network, as well as committed anchor tenants. Private-sector partners bring network-building and operations experience.

ACTIONS:

1. Determine Priorities: Competition, enhanced service, equity and service to all, public control over infrastructure, risk avoidance, redundancy, etc.
2. Examine models of partnership:
 - a. Model 1: Private Investment, Public Facilitation: Make available public assets like fiber and conduit, share geographic information systems data, streamline permitting and inspection processes, offer economic development incentives to attract private broadband investment
 - b. Model 2: Private Execution, Public Funding: Identify revenue streams that can be directed to a private partner, issue RFP for private turnkey execution.
 - c. Model 3: Shared Investment and Risk: Evaluate using assets to attract private investment, evaluate funding new assets to attract private investment, evaluate building new fiber assets to businesses and/or homes for leasing to private ISPs.
3. Understand key legal considerations for localities looking to build a broadband partnership: Review authority issues, understand the legal tools and instruments that could shape the partnership, negotiate the agreement.

RESPONSIBLE PARTIES:

- Local units of government
- Broadband providers
- Community anchor institutions
- Residents and businesses

RESOURCES:

- Dept. of Commerce guide to effective public-private partnerships: <http://bit.ly/1B7L9YD>.
- Building rural broadband from the ground up: <http://bit.ly/2dx4MBw>.
- United States Department of Agriculture: <http://www.usda.gov/wps/portal/usda/usdahome>
 - Broadband Loan Program: http://www.rurdev.usda.gov/supportdocuments/BBLoanProgramBrochure_8-11.pdf.
 - Direct Loans: <http://www.rurdev.usda.gov/supportdocuments/Broadband%20Application%20Guide%203.14.11.pdf>
 - Community Connect: <http://www.rurdev.usda.gov/SupportDocuments/utp2013CommConnectAppGuide.pdf>
 - Distance Learning and Telemedicine: http://www.rurdev.usda.gov/UTP_DLT.html
- Broadband USA: Guide to Federal Funding of Broadband Projects: http://www2.ntia.doc.gov/files/broadband_fed_funding_guide.pdf
- Universal Service Rural Health Care Program - <http://www.universalservice.org/rhc/telecommunications/default.aspx>.

BENEFITS:

1. The public sector transfers much of the risk for private investment. (The public sector has many funding tools available, including incentivizing continued investment through tax credits, encouraging greater availability of private capital through government guaranteed loans, or use of government loans or grants as a direct source of capital.)
2. The partnership can aggregate demand and reduce barriers to deployment.
3. Concentrates investment on non-duplicative networks and aims to ensure that all residents have access to adequate broadband service.

Complete a Vertical Assets Inventory

GOAL: Develop a single repository of vertical assets, such as communications towers, water tanks, and other structures potentially useful for the support of deploying affordable, reliable wireless broadband in less populated rural areas or topographically challenged areas.

DESCRIPTION: Wireless communications equipment can be placed in a wide variety of locations, but ideally, wireless providers look for locations or structures in stable conditions, with reasonably easy access to electricity and wired telecommunications, and with a significant height relative to the surrounding area. “Vertical assets” are defined as structures on which wireless broadband equipment can be mounted and positioned to broadcast a signal over as much terrain as possible. These assets include structures such as cell towers, water tanks, grain silos, and multi-story buildings.

The lack of easily accessible and readily usable information regarding the number and location of vertical assets prevents the expansion of affordable, reliable wireless broadband service. Wireless broadband providers must determine if it is worth the effort and expense to collect and analyze this data when making investment decisions. Public sector organizations are faced with the same challenges. A centralized and comprehensive vertical assets inventory can help wireless broadband providers expedite decisions regarding the deployment of affordable, reliable broadband service in rural areas.

ACTIONS:

1. Identify or develop a vertical assets inventory toolkit to provide guidelines to identify structures or land that could serve as a site for installation of wireless communications equipment.
2. Data to collect would include vertical asset type, owner type, minimum base elevation, minimum height above ground, and location.
3. Identify and map elevated structures using your community’s GIS resources. The resulting database should be open-ended; localities should be encouraged to continuously map assets as they are made available.
4. Disseminate information to wireless providers who may be interested in leveraging vertical assets.

RESPONSIBLE PARTIES:

- Local and county government
- Broadband providers, particularly wireless
- Residents, businesses, and institutions with vertical assets able to support wireless equipment

RESOURCES:

- Making rural broadband possible through agricultural assets: <http://bit.ly/2dpEUef> .
- 2pifi helps communities develop solutions to provide connections in hard to serve areas: <http://2pifi.com/>.

BENEFITS:

1. Provides data for private and public investment decisions, lowering the initial cost of efforts needed to identify potential mounting locations for infrastructure.
2. Encourages expansion of affordable, reliable wireless broadband services to underserved areas by shortening project development time.

Adoption Recommendations

Launch a Digital Equity Initiative

GOAL: This initiative provides a foundation for overcoming the barriers to broadband adoption via outreach, awareness; access to affordable broadband services and devices and digital skills training.

DESCRIPTION: This initiative will help to sustain in-depth discussions around the adoption issue in the community by bringing together public-private partners.

With the data gathered through this technology planning process, leaders will be able to focus on specific studies and solutions that will have the most positive impact on the community.

There are several tasks the digital equity initiative can undertake depending on the needs identified in the community. Each task has its own implementation profile, but include: developing a community-based technology awareness program, promoting low-cost broadband service offerings; facilitating digital literacy training; making available low-cost devices; and identifying and expanding wireless hotspots in the community.

ACTIONS:

1. Create a digital inclusion taskforce composed of public and private stakeholders. The digital equality initiative will seek programming that address the digital divide for groups without an Internet connection at home.
2. The taskforce will use this plan to create a vision for advancing broadband adoption and assign responsibilities.
3. The taskforce will oversee the implementation of projects that will advance the adoption of broadband technologies for all residents.
4. After implementation the taskforce will show results and shift plans in accordance with technology changes.
5. Economic development, new jobs, and an improved quality of life will be achieved when a community experiences increased usage of computers and the Internet; improved basic computer skills, increased use of technology in day-to-day operations of a community, and increased access to economic opportunities.

RESPONSIBLE PARTIES:

- Non-profit organizations focused on technology
- Libraries and schools
- Public computer centers
- Local governments
- Private sector
- Broadband providers
- Local financial institutions and foundations

RESOURCES:

- Partners Bridging the Digital Divide helps communities establish robust digital inclusion programs: <http://pbdd.org/>.
- Dept. of Commerce guide to broadband adoption programming: <http://bit.ly/2dfr77p>.

BENEFITS:

1. Leverages community resources to create opportunities for the advancement of those being left behind in the digital age.
2. Unifies vision of community stakeholders.
3. Highlights successes, opportunities, and challenges regarding community technology planning.
4. Promotes an ongoing dialogue around improving broadband access, adoption, and use.

Digital Equity – Promote Low-Cost Broadband Service Offerings for Vulnerable Populations

GOAL: Overcome the barrier to broadband adoption related to cost.

DESCRIPTION: Currently, several national and a few local providers offer special low-cost services for vulnerable populations, older adults and low-income families with children.

Furthermore, the Federal Communications Commission (FCC) is expanding its Lifeline program to allow Lifeline monthly subsidy to be applied to purchases of broadband service (as of December 2, 2016).

Administered by the FCC, the Lifeline program provides a \$9.25 per month subsidy for the purchase of voice telephone service, including mobile, and broadband (as of December 2, 2016) by low-income households. This move would make low-cost service a reality for Lifeline participants.

ACTIONS:

1. Research low-cost offering in the community. Visit <http://everyoneon.org/> to find local low-cost, high-speed Internet offers by ZIP code or contact local providers listed in this plan to determine their offerings.
2. Schedule community meetings (or summits) to discuss the opportunity to serve non-adopters who are experiencing a cost barrier to adoption.
3. Advertise low-cost offerings via government and other community organizations websites via the digital equity initiative.

RESPONSIBLE PARTIES:

- Non-profit organizations
- Libraries and schools
- Parent-Teacher Organizations
- Broadband providers with low-cost programs
- Senior centers
- Social service providers
- Local and county government.

RESOURCES:

- Use the FCC's Cost Comparability tool to check the reasonability of local broadband prices: <http://fcc.us/2d6QBY5>.
- Universal Service Administrative Company: <http://www.lifelinesupport.org/ls/changes-to-lifeline.aspx>.
- Lifeline Program for Low-Income Consumers: <https://www.fcc.gov/general/lifeline-program-low-income-consumers>.
- Carrier-based programs Include:
 - Access from AT&T: <https://www.att.com/shop/Internet/access/#/>
 - Spectrum Internet Assist (Charter): <https://www.spectrum.com/browse/content/spectrum-Internet-assist>
 - Comcast Internet Essentials: <https://www.Internetessentials.com/>

BENEFITS:

1. Availability of low-cost services will help vulnerable populations overcome the cost barrier to accessing the Internet.

Digital Equity – Facilitate Digital Literacy Training in Partnership With Communication Organizations for Vulnerable Populations

GOAL: Overcome the skills barrier to broadband adoption.

DESCRIPTION: Create a partnership between libraries, schools, senior centers, broadband providers, and other community organizations to offer basic digital or leverage training resources currently available.

These training resources consist of computer labs where in-person training can be hosted and training courses are already being provided.

Additionally, the training programs can leverage free content widely available online for deriving curriculum or new learners that are able to handle self-paced training. Training facilities can also be used to support local community technology advances. For example, as more and more services become automated, the training program can be used to update residents on technological changes that impact them.

ACTIONS:

1. Reach out to neighborhood influencers including churches, community centers, schools, libraries, after-school programs, and other neighborhood community organizations' leadership to garner support for the program.
2. Identify and/or outfit a suitable training facility with a sufficient number of computers, software, and broadband connectivity. It is important to ensure that the facility has hours of operation that are conducive for the target audience.
3. Identify training instructors. There are three potential sources for instructors: volunteers, hired instructors; and local instructors from existing programs. Once identified, instructors must be provided adequate resources and training in order to effectively train others.
4. Training should include online safety and cybersecurity measures in order to protect children and sensitive information.
5. Facilitate and support outreach and awareness efforts. It is very important to understand the target population because failure to reach them with appropriate messaging about the training may result in minimal interest and low attendance at the training sessions.

RESPONSIBLE PARTIES:

- Non-profit organizations
- Libraries and schools
- Community and senior centers
- Private-sector technology companies, (e.g., web developers, device repair, etc.)

RESOURCES:

- The Drive digital learning hub provides ready access to a variety of digital literacy training programs: <http://driveyourlearning.org/>.
- Online portal to digital literacy training: www.digitalliteracy.gov.
- Harbor, Inc. launches digital training: <http://bit.ly/2daluG1>.

BENEFITS:

Improved digital literacy skills among targeted groups improves broadband adoption, allowing further inclusion in the digital economy.

Digital Equity – Initiate a Program to Make Available Low-Cost Devices

GOAL: Overcome the cost barrier to using computers to access Internet applications and other resources.

DESCRIPTION: Initiate a computer refurbishment program designed to help recycle computers donated by local businesses, government, schools, and other organizations, and then distribute them to low-income households and other households who face affordability barriers to computer ownership. Community computer refurbishing provides an opportunity for local volunteers and students to gain valuable new skills and training that can be used for career enhancement, and in some cases earn credits for high school or college, while reinvesting in their communities. Communities also have the option of using prison inmates to refurbish computers so that they leave prison with valuable job skills. Alternatively, if the computers are beyond refurbishment, the community can develop a computer recycling program. Recycling and reusing electronic equipment reduces the amount of hazardous materials that may enter the environment. Recycling and reuse programs also reduce the quantities of electronic scrap being landfilled in the state.

ACTIONS:

Develop a model for computer refurbishing or recycling. A basic framework might include:

1. **Project Planning:** Determination of minimum computer specifications. Acquisition and storage of donated computers. Determination and installation of appropriate computer operating system. Calculation of costs needed to carry out the program.
2. **Inventory Management:** Examine how equipment and software will be sorted and managed; manage inventory by identifying computers that are ready to be refurbished from those that are non-functioning.
3. **Volunteer Training:** Review established residential refurbishment and recycling programs that the community can take advantage of.

RESPONSIBLE PARTIES:

- Non-profit organizations
- Libraries and schools
- Senior centers
- Private-sector technology companies, (e.g., web developers, device repair, etc.)

RESOURCES:

- InterConnection helps communities establish device refurbishment programs and provide devices to those in need: <http://www.interconnection.org/>.
- Dell Reconnect: <http://dellreconnect.com/>.
- E-Cycling Central: <http://www.eiae.org/>.

BENEFITS:

1. Computer refurbishing programs have proven to be an excellent workforce training tool for correctional facilities, young adults, and the mentally and physically challenged. The correctional facility program trains inmates with computer skills that could help them find jobs upon their release.
2. Demanufacturing helps conserve energy and raw materials needed to manufacture new computers and electronic equipment. These parts are then reused in upgrading other computers.

Facilitate a Community Technology Summit

GOAL: A technology summit should bring together community stakeholders to develop a dialogue about how public and private stakeholders can collectively improve broadband access, adoption, and use.

DESCRIPTION: Develop and host a technology summit for residents and businesses to increase awareness of broadband value, service options, and the potential impact on quality of life.

The technology summit should facilitate community partnerships between leaders in local government and the private sector, including non-profits and private businesses in the education, healthcare, and agriculture sectors, with the goal of ensuring that residents have at least one place in the community to use powerful new broadband technologies, and that this asset will be sustained over time.

Further, the technology summit should highlight success stories as evidence of the impact of technology.

ACTIONS:

1. Create community partnerships.
2. Identify funding sources and hosts.
3. Identify suitable speakers.
4. Develop relevant content.

RESPONSIBLE PARTIES:

- Community leaders/organizations
- County/City government
- Broadband providers
- Citizens
- Schools, districts, higher education
- Libraries
- Businesses/IT professionals/technology companies

RESOURCES:

- The Texas A&M University System Technology Summit <http://techsummit.tamu.edu>
- National Telecommunications & Information Administration <https://www.ntia.doc.gov/other-publication/2015/Nesummit>
- Michigan Broadband Conference in review: <http://connectmycommunity.org/project-view/michigan-broadband-conference-in-review-the-human-impact/>.
- Iosco County Summit Showcases Business and Technology Growth: <http://connectmycommunity.org/project-view/iosco-county-summit-showcases-business-and-technology-growth/>

BENEFITS:

1. Highlights successes, opportunities, and challenges regarding community technology planning.
2. Develops ongoing dialogue around improving broadband access, adoption, and use.
3. Unifies community stakeholders under one vision.

Use/Libraries Recommendations

Improve the Online Presence of Libraries and Build Community Awareness of Online Resources

GOAL: Robust online presence for libraries in the community and greater use of those resources by residents and businesses.

DESCRIPTION: Libraries provide vital access to information, resources, and digital tools.

While libraries offer a physical space to access information and resources, a robust online presence for libraries can also benefit residents who may not regularly visit library locations.

This project aims to improve the online presence and digital resources of the community's libraries and build awareness and use of those resources by residents and businesses.

ACTIONS:

1. Assess the current state of digital resources, social media, and community awareness of digital resources among all libraries in the community. Much of this has been completed through the Connected assessment and can be found in the Use-Libraries and Community Organizations section.
2. Develop a strategy for improving the offering of digital resources and the online presence of libraries. Improving the online presence of libraries could include more frequent use of social media, electronic distribution of library surveys, development of instructional videos for upload to YouTube, livestreaming of library events using platforms such as Meerkat and Periscope, hosting webinars with authors or others in which the community can participate, etc.
3. Develop a strategy for building the awareness for the library's digital presence. Work with community partners to spread the word about the library and the various ways they can digitally interact. Develop outreach materials that reach critical groups in the community such as families with children, senior citizens, low-income residents, and others.

RESPONSIBLE PARTIES:

- Libraries and library co-ops (if applicable)
- Schools
- Non-profit organizations
- Local and county governments
- Social service providers and agencies

RESOURCES:

- Libraries are posting but is anyone listening: <http://bit.ly/1zTjCe5>.
- How libraries are using social media: <http://bit.ly/2dqWHS8>.
- Use of social media by the library: <http://bit.ly/13VTNeS>.
- Building library community through social media: <http://bit.ly/2cNTbPR>.

BENEFITS:

1. Improved digital civic engagement in the community.
2. Expanded access to digital resources for residents and businesses.
3. Greater awareness and appreciation for libraries and their offerings.

Implement Cybersecurity Training

GOAL: Ensure that community members are aware of how to navigate the Internet safely.

DESCRIPTION: Create a program designed to help community members who are using the Internet to identify and avoid situations that could threaten their safety, threaten business or government networks, compromise confidential information, compromise the safety of children, compromise identities and financial information, or destroy reputations.

There are many risks, some more serious than others, when using the Internet. Among these dangers are viruses erasing entire systems, a hacker breaking into a system and altering files, someone using someone else's computer to attack others, someone stealing credit card information, sexual predators making advances at children, and criminals making unauthorized purchases.

Unfortunately, there's not a 100% guarantee that even with the best precautions some of these things won't happen, but there are steps that can be taken to minimize the chances.

ACTIONS:

1. Partner with a local library or community center to offer security awareness training initiatives that include classroom style training sessions and security awareness websites and information booklets.
2. Trainers could include technology advocates, private businesses specializing in cybersecurity, web development, etc., local law enforcement, and others. Additionally, financial institutions often have cybersecurity training and curriculum for their members that could be leveraged to help the entire community.
3. Cybersecurity should be addressed to both residents and businesses.
4. Some libraries and organizations may already have cybersecurity training established. These programs can be expanded in content and availability to the community.
5. Awareness training can also be used to alleviate anxiety for community members who are not using the Internet because of fear of cyber threats.

RESPONSIBLE PARTIES:

- Libraries and library co-ops
- Schools
- Non-profit organizations, particularly those with a technology focus
- Businesses specializing in web security and identity protection
- Local financial institutions
- Law enforcement

RESOURCES:

- Internet Safety: <http://www.gcflearnfree.org/internetsafety/>
- Cyber Safety: http://ikeepsafe.org/educators_old/more/c3-matrix/cyber-safety/
- Digital Citizenship: <https://www.commonsemmedia.org/educators/digital-citizenship>.
- Digizen: <http://www.digizen.org/>
- Better Internet for Kids: <https://www.betterinternetforkids.eu/>.
- How School Librarians Can Assist You: <http://www.ala.org/aasl/parents/internet>.
- CyberWise: <http://www.cyberwise.org/>

BENEFITS:

1. Improved understanding of how to prevent and deal with cyber threats.
2. Better understanding of how to keep personal information safe online and what to do should it be compromised.
3. Better, community-wide, digital citizenship.

Use/Government Recommendations

Improve the Online Presence of Local Government, Implement Advanced Website Features, and Improve Civic Engagement

GOAL: Improve the functionality and accessibility of the website of local units of government in the community.

DESCRIPTION: E-government, or the use of information and communications technologies to improve the activities of the public sector, can be an effective tool for improving the delivery of services to residents and creating operational efficiencies for local governments.

Local units of government can improve civic engagement by employing digital tools aimed at involving citizens, businesses, and institutions in local decision making. The assessment of local government websites and their use of advanced features provide those municipalities with a thorough examination of their website and offers ways to improve its functionality.

Improving citizen use of local government online resources includes providing both a reason and a means for them to interact. Advanced web features, including ways to transact and conduct business with the municipality, livestreaming of public meetings, and online surveys to gauge public opinion, are just a few ways to provide citizens with a reason to digitally interact. Various social media platforms and a robust website provide the means by which they interact.

**For communities not participating in this website assessment, the link to a free website analysis tool is located in the resource section on the next page.*

ACTIONS:

1. Ensure local municipalities have access to this Technology Action Plan and have located the link to their custom website analysis. The Use - Government section of this assessment includes a table with the detailed scores for each local government website tested and a link to the full report generated for each site. Leadership within each municipality should have access to this report and be able to find their related information. Additionally, this section also includes a table that shows the more advanced uses present and not present on participating municipality websites.
2. Each municipality, with the assistance of their IT staff or contractor, should examine the website and the accompanying report and develop a plan for implementing recommendations and making changes.
3. Some website changes, such as implementing more advanced features as listed in the assessment, may require more advanced assistance to implement. Local web developers could help local governments implement more advanced changes.
4. If not yet completed, municipalities should develop and implement policies of various web-related activities such as website update schedules and assignments, social media updates and response to comments, etc.
5. Municipalities should examine the ways in which they digitally interact with the public including e-mail, social media, and other means. Opportunities for expansion of these efforts should be examined.
6. Finally, municipalities should implement new digital civic engagement strategies and work to build awareness for the new online tools and opportunities with the public. Public service announcements, radio spots, public access television, and newsletters can help spread the word.

RESPONSIBLE PARTIES:

- Local and county government
- Web developers and IT professionals

RESOURCES:

- Free website analysis tool: <http://bit.ly/1nZV1bG>.
- Courtland Consulting specializes in government and non-profit web development: <http://courtlandconsulting.com/>.
- Institute for Local Government Online Engagement Guide: <http://www.ca-ilg.org/online-engagement-guide>.
- Community Change Through Facebook: <http://connectmycommunity.org/project-view/community-change-through-facebook/>.
- Disaster Relief Starts Online in Michigan: <http://connectmycommunity.org/project-view/disaster-relief-starts-online-in-michigan/>

BENEFITS:

1. Improved civic engagement.
2. Greater online offering of local services.

Use/K-12 Education Recommendations

Offer Professional Development Programs for Teachers on Classroom Applications

GOAL: Ensure that educators have the skills needed to integrate technology into the classroom.

DESCRIPTION: Provide professional development and opportunities for staff to gain skill in integrating technology into all content areas and utilizing technology for instruction. To ensure proper training is being offered, technology standards should be created to guide professional development and should provide guidance on strategies and content appropriate for developing skills and proficiency in utilizing instructional technology at all levels. Instruction starts with keyboarding and online academic resources beginning in primary levels through increasing complex skill development and projects and research through graduation.

In addition, school administrators should be encouraged to provide support for the development of a web-based professional development and administrative support program for educators. eTech Ohio, for example, “serves as a one-stop shop for providing planning, support, and information about grants, subsidies, and professional development, as well as teaching, learning, and technology integration.” The program also supplies resources for administrators and technology support staff.

ACTIONS:

1. Develop technology standards and guide professional development.
2. Encourage teachers and school districts to create clear visions of what an ideal classroom with integrated technology looks like. Individual teachers can design their own technology growth development plans by outlining their expectations for the school year.
3. Build an on-campus and/or online professional learning network.
4. Funding for professional development could be strategically allocated to encourage experimentation with supportive technologies in addition to, or perhaps in lieu of, more traditional onsite assistance. Conversely, the school district could invest in a full-time “technology facilitator” who provides teachers with convenient solutions to technical queries.

RESPONSIBLE PARTIES:

- Federal, state, and local education departments and districts
- Curriculum directors
- Higher education
- School board members and committees
- Teachers and students

RESOURCES:

- Office of Educational Technology: <https://tech.ed.gov/#>.

BENEFITS:

1. Encourages hesitant teachers to use technology in the classroom.
2. Enables educators to update curriculum to reflect technology integration.

Explore Web-Enabled Formats for Course Delivery

GOAL: Increase the use of web-enabled curriculum in K-12 education to provide additional learning opportunities for students.

DESCRIPTION: Online content and web-enabled course delivery can provide opportunities for learning beyond the traditional face-to-face course format found in many K-12 institutions.

While much research is still to be conducted on the effectiveness and best practices for incorporating web-enabled formats and content delivery into K-12 curriculum, the community should explore ways that online delivery might benefit students.

This project aims to find ways in which K-12 schools in the community could expand learning opportunities through digital and online means.

ACTIONS:

1. Gather a team of K-12 teachers and administrators to explore the topic. A small group of teachers and administrators interested in the topic could serve as researchers and advisors to study the opportunities and make recommendations. Students and parents could also be included in this group to provide feedback and perspective.
2. Inventory current efforts. The group should work with teachers and administrators to inventory the current ways in which digital content and web-enabled course facilitation are currently being conducted in the K-12 environment. Some of this inventory has been completed as part of this planning effort.
3. Research new opportunities. Following the inventory, the group should research opportunities for expanding existing web-enabled content and implementing new facilitation styles into curriculum delivery. The group should work closely with experts in this field to include public and private entities, as well as the state department of education.
4. Report and recommendations. Finally, the group should prepare a summary report of the current state, research, and recommendations to school administrators and staff. This report will provide a foundation for then implementing new web-enabled content and delivery for the schools.

RESPONSIBLE PARTIES:

- Schools, including teachers, administrators, and students
- Parent-teacher organizations

RESOURCES:

- US. Department of Education: Use of Technology in Teaching and Learning: <http://bit.ly/1HIGyMm>.
- Summary of research on the effectiveness of K-12 online learning: <http://bit.ly/2dxcaAB>.
- K-12 roundup of tools and resources: digital content: <http://bit.ly/1bYC9LF>.
- The 32 most innovative online educational tools: <http://bit.ly/1GX2F4p>.

BENEFITS:

1. Greater opportunities to access content and expand learning opportunities for K-12 students.
2. Greater awareness for digital resources and tools among students, parents, and educators.

Explore One-to-One Device Programs

GOAL: Improve student learning through individualized access to the internet.

DESCRIPTION: Online content and web-enabled course delivery can provide opportunities for learning beyond the traditional face-to-face course format found in many K-12 institutions. These applications can be further bolstered by providing students with their own internet-enabled devices.

Advancements in technology and personal computing provide new opportunities for student engagement and learning. Implementing a one-to-one device program is not a light undertaking, and requires the input and dedication of administrators, teachers, and students.

ACTIONS:

1. **Create your 1:1 vision and leadership team:** A 1:1 program is not about the devices, rather it's about creating an environment where all students have greater access to learning resources. Planning teams should include a diverse array of stakeholders from the school including administrators, teachers, students, and others.
2. **Research other implementations:** Many schools have implemented 1:1 device programs across the country, some more successfully than others. Seek out examples from similar districts, including those in the same community.
3. **Assess district readiness:** There are a number of factors to consider including leadership, long-term funding, staff skillsets, training/professional development, enabling or hindering policies, device purchase vs. bring-your-own-device model, internet connection and wireless capabilities, etc.
4. **Hire a project manager and consult with experts:** Topical and technical expertise could be beneficial to the project to bring outside perspective, experience, and knowledge of how to successfully implement the program.
5. **Create a strategic plan:** The strategic plan should outline the vision, research, and readiness work completed to date, and should also include goals and objectives, communications plans, finances, hardware and infrastructure, capacity building, benchmarking, and project timelines.
6. **Develop a financial plan:** A minimum five-year financial plan should be in place when implementation begins. Short and long-term funding should be considered as devices age, need maintenance, and equipment needs replaced, and bandwidth increased.
7. **Assess infrastructure needs:** 1:1 device programs require robust infrastructure to support the connectivity of hundreds or thousands of new devices. Infrastructure issues include bandwidth, connectivity and access points, data systems, data management and storage, mobile device management, security and content filtering (if applicable), tech support and maintenance, etc.
8. **Consider a pilot:** Pilot programs help to demonstrate capabilities and help to work out bugs and test various solutions.
9. **Ensure curriculum and pedagogy embrace technology:** New technology brings new ways to deliver knowledge. Curriculum directors, teachers, and students should examine and research new ways to leverage student devices in and out of the classroom.
10. **Install collaborative and ongoing professional development:** New technology and curriculum requires new, and ongoing professional development for instructors. Professional development should follow a cycle of learning, discussing, testing, and adjusting until new curriculum and methods work for students.

RESPONSIBLE PARTIES:

- Schools, including teachers, administrators, curriculum directors, and students
- Parents and their related organizations
- Outside management and consultants (as needed)

RESOURCES:

- One-to-One Institute's Project RED: <http://one-to-oneinstitute.org/introducing-project-red>.
- Connected Nation's Edified Initiative: <http://www.connectednation.org/edified>.
- Ten Rules for a Successful One-to-One Classroom: <https://www.wereateachers.com/10-rules-for-a-successful-one-to-one-classroom/>.
- Five Steps for Implementing a Successful 1:1 Environment: <https://www.edutopia.org/blog/one-to-one-environment-andrew-marcinek>.

BENEFITS:

Expanded learning opportunities for students

Use/Higher Education Recommendations

Encourage the Development of Massive Online Open Courses (MOOCs)

GOAL: Improve the online presence of higher education institutions by offering one-of-a-kind courses to an international audience via the Internet.

DESCRIPTION: A MOOC is a free course of study made available over the Internet to a very large number of people. MOOCs have gained popularity in higher education as a way to provide educational content to a global audience.

While a MOOC is not an online degree, nor is typically offered for credit, MOOCs are an opportunity for higher education institutions to garner interest in their courses of study from a broad audience that would otherwise not be accessible. Additionally, a MOOC allows an institution to highlight its unique curriculum, leading faculty, and programs in a way that may attract students locally, nationally, or internationally.

ACTIONS:

1. Institutions should establish supporting policy and guidelines for the creation of MOOCs and examine policies that may prevent the development of MOOCs by faculty.
2. Faculty should be encouraged to develop MOOCs and be provided with proper training and resources to do so.
3. Institution-supported work groups of faculty, administration, marketing, and communications staff could help leverage newly developed MOOCs to promote the institution's programs, courses, and faculty.

RESPONSIBLE PARTIES:

- Higher education administration, director of technology, IT department, department heads, faculty
- Students

RESOURCES:

- Designing and running a MOOC: <http://www.slideshare.net/gsiemens/designing-and-running-a-mooc>
- Five MOOC building platforms: <https://www.learndash.com/5-mooc-building-platforms/>
- Tips for Designing a MOOC: <http://facdevblog.niu.edu/tips-for-designing-a-massive-open-online-course-mooc>
- University of Pennsylvania MOOC Development Guide: <https://www.onlinelearning.upenn.edu/resources/instructor-resources/resources-mooc-development-delivery/>

BENEFITS:

1. Leverages web-enabled technology to provide educational content locally and abroad.
2. Fosters the potential to attract interest in institution programs and course offerings from an otherwise unreachable market.