

RURAL BROADBAND: WHERE THE BLACKTOP ENDS AND THE LAST MILE

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Broadband commonly refers to high-speed internet access that is always on and faster than the traditional dial-up access. Most urban areas in the United States have broadband services abundantly provided, but adequate broadband in rural areas in Kentucky and other parts of the country still do not have enough internet service needed to perform and compete in modern markets and complete necessary tasks in communications for education, businesses, health care, and farming communities.

INTRODUCTION

In 1999, country music artist, Keith Urban, debuted his hit song “Where the Blacktop Ends”, and the song remained popular for nearly a decade. The lyrics of the song described the joys of escape to rural life, away from urban grind. The song could have described the drive through many counties in Kentucky that were filled with scenic croplands, rolling green pastures, and livestock. Such a drive left little doubt that agriculture was king in rural sections of the region.

Kylen and Beth Douglas understand all too well about the advantages and disadvantages of living “where the blacktop ends”. They owned and operated a family farm in Henry County, Kentucky, and they also knew all too well how much internet connectivity plays in their family’s life on the farm where Kylen grew up. They readily admitted that there is no other place on Earth they would rather be, but modern farming needed technology, and, on their farm, that didn’t always happen. Having consistent internet service provided time-critical marketing information for crops and livestock that could be the difference between a profitable year or not.

They were not alone. In 2018, rural areas throughout the United States still did not have consistent enough service to adequately operate things like sophisticated GPS

(Global Positioning Systems) and fail-proof cell service. Modern farming equipment used technology that needed sufficient broadband in order to work properly and for periodic software updates to take place. In the modern world of technology, connectivity was essential to compete.

Many farmers needed to work off-farm jobs to supplement their income, and in many cases, they also needed connectivity for that employment. Many who lived in rural areas remember listening to their parents and grandparents talk about the advantages electricity and city water made when coming to their part of the world. It would only make sense that sufficient broadband service should be next.

“A lot of times it depends on which hill you’re standing on and which way the wind blows as to whether or not I can get service out here,” Kylen said, “And that can get frustrating at times, especially when you are really depending on it.” In addition to seeing this issue from a farmer’s viewpoint, Kylen also saw it as it related to his second job and career, as an agriculture teacher and FFA (Future Farmers of America) advisor at Franklin County High School. The need for adequate broadband made that job a little more challenging when trying to work from home, which was something teachers often do.

“I’ve lived on this farm my whole life except for a few years while I attended college. It is a very traditional farm that includes tobacco, hay, some of which is organic hay, a smaller feeder cattle operation, and a couple of beef cattle herds along with corn and soybeans,” he said, “But even the most traditional of farms rely on good broadband service and once you get away from the interstates, the service out here gets pretty sparse.”

Beth Douglas, Kylen’s wife, took care of most of the business needs, paper-work, and records for the farm while also taking care of their three children. She pointed out that although the farm was located in an area just outside of the triangle that includes metro areas of Louisville, Lexington, and Cincinnati, the service they needed was just not available. “We can get service here but it’s not the quality of service you get when closer to bigger cities,” she said. “As we use the internet more and more for things like taking online classes, ordering goods for the farm and family, and even working some jobs from home, the need for adequate service grows, as well.”

As poor as the service could be at times, it got even worse if both Beth and Kylen were online at the same time. “It becomes really slow around 6:30 at night when more people are home and using their computers,” he said. From a teacher’s perspective, Kylen could sympathize with his students who lived in the more rural areas and had a difficult time using the internet for school homework. Students in

his county had individual access to Chromebooks, and much of their schoolwork was now done via the computer and the internet. “I do have many students that live in rural areas, like I do, so I understand that sometimes, in giving a certain assignment, those students may not be able to do it,” he said. “And a lot of our assignments are internet-based nowadays and you have to adapt. But for myself and rural students you have to keep in mind that that service may not be available.” Often Kylen had to make the trip into town to be able to complete a task for school or the farm utilizing broadband service and stated that it could be just the price for living where he does.

His neighbor and local advocate to improve the rural broadband service in Henry County did not see Kylen’s view of the price he pays for where he lives. Janet Grissom had worked for 30 years in Washington D.C. in many public service jobs, including having served as Chief of Staff for Senator Mitch McConnell and in the Whitehouse under the George H.W. Bush administration. She said the lack of broadband service in rural areas is appalling and limits the opportunities for the businesses and people in those communities.

“The internet has become as basic of a utility as water or electric. Students have to be able to access the internet to do their homework; small business people need it for marketing purposes, farmers need it for their businesses...” Grissom said, “But it’s a complicated issue and it’s not all going to come from the government or the private sector, but it has to be a partnership.” Grissom noted that in order for broadband to get to that last mile, it has to remain a priority, noting the sectors that were affected by connectivity included economic development, healthcare, agriculture, and education (Thornberry, 2018).

NET NEUTRALITY FOR RURAL BROADBAND AND LEGAL CHALLENGES

You may have heard the phrase “net neutrality” before, but some people may not know parts of the background and challenges that have led the conversation and how it may affect rural broadband. Net neutrality was a set of rules introduced 2014 that basically demanded equality for all Internet content. It should not matter where you lived, what you did, how rich or poor you were. To compete on an even playing field, everyone must have comparable access to internet content. To understand the background, one first has to look at the basic history of legislation, and then look at how the outcomes will affect rural broadband in the future.

Legislative History in Brief

In 2014, the United States Court of Appeals for the District of Columbia struck down the Federal Communication Commission (FCC) Open Internet rules that required equal treatment of Internet traffic. It prevented broadband providers from blocking

traffic which would provide more service to certain sites or charging special fees to companies that account for most of broadband streaming of traffic. The court ruled that the FCC had given service providers the same types of requirements as common carrier telephone services, even though the commission had decided not to classify broadband as a telecommunications service. On February 26, 2015, the FCC decided to reclassify high-speed Internet as a telecommunications service, which prohibits the blocking of content, creation of faster connectivity, or making connectivity slower for some users. The rules applied to mobile and wireless services for phones and other devices, as well as wired lines. The changes also included provisions to ensure services would be available to people in remote areas. The new rules were then endorsed by a decision by the United States Court of Appeals for the District of Columbia on June 14, 2016 (Kang, 2016 & Selyukh, 2016).

In December 2017, the Federal Communications Commission, in a 3-2 vote repealed the legislation deeming broadband internet a Title II utility. In short, the FCC voted to relinquish the ability to regulate Internet Service Providers (ISPs). Congress tried to repeal via the Congressional Review Act in 2018. A vote to overrule the FCC's decision passed the Senate and moved on to the House; however, in the meantime, several ISPs filed lawsuits in an attempt to fight the FCC's net neutrality rollback, as well as a number of state attorneys general. On November 5, 2018, the United States Supreme Court denied an appeal from a lower court's ruling requested by the telecommunications industry. The Supreme Court's decision would not make a huge difference to an ongoing federal overhaul of net neutrality regulations in the short term, but it could set a precedent for future court cases (Corbett, 2018 & Price, 2018).

OUTCOMES FOR RURAL BROADBAND

As noted in the opening of this case, rural areas in the United States experience a disadvantage when it comes to broadband infrastructure. As of 2016, 39 percent of rural communities lacked access to true broadband – defined as a minimum download speed of 25 Mbps – despite the availability in urban areas. Over ten million U.S. households did not have access to broadband at all, and 46 million rural households had only one provider offering wired 25 Mbps speeds. Internet Service Providers insisted that network congestion was a serious problem and that expanding their services would require higher costs to consumers (Dunne, 2017). Given that the infrastructure needed to be in place for broadband, and those people in the rural areas had to find ways to acquire the backbone media to gain that connectivity, the case for net neutrality was a double-edged problem. The need was there, but without telecommunications ISPs on board, there laid a problem that legislation alone might not be able to provide answers. (See Exhibit 1 at the end of the case.)

For example, video streaming has accounted for most bandwidth use during peak areas of use, where broadband was available. Combined with Netflix, Google YouTube, online gaming, and other access such as Hulu or Amazon Prime, cable providers (such as Comcast, or AT&T/DIRECTV) might block online streaming from other companies to force customers to use the cable company's on-demand movie rental services. Some companies believed government regulations might discourage competitiveness by preventing capital expenditures to grow the demand for Internet and Wireless traffic which needed the infrastructure to provide those services. However, equal treatment of access and prevention from blocking certain traffic to sites might need some regulation. That was the crux of "net neutrality."

Access and streaming issues were already an issue for rural Americans and getting rid of net neutrality would have impacted them the most. Kylen and Beth Douglas in the state of Kentucky were not alone. Kate Vickery and her husband lived in Colorado and were horse people. They also worked in technology by developing and designing software. When they moved to Colorado in 2017, they were looking for two things in a new home: wide open space and a solid internet connection. They finally found a place in Westcliffe, Colorado, a town of around six hundred people nestled in a pastoral valley between two snow-capped mountain ranges.

Kate pondered about where she lives now, "You know you may still have a hard work day, life is still life, but at the end of the day you walk out your front door and you've got mountains and horses and pasture and life is okay." Life was alright for Vickery because her internet was mostly good. From her home office she could see through the window to some hills that have a wireless tower on them. That cell tower was Vickery's connection to the internet, but, she said, "If you're on the wrong side of the mountain where you've got the shadow of a hill in the way then you don't have broadband access."

Caroline Fry, advocacy and media manager for Colorado Common Cause, was in the camp for net neutrality. She stated, "What net neutrality protects is for content to operate freely online." She also added that people living in rural communities like Westcliffe were already at a disadvantage when it comes to internet and that made them especially vulnerable. She said they relied more on the web for running their businesses, accessing education, news, health care, entertainment – you name it – but they often had fewer options when it comes to providers. Fry continued, "So there's more of a risk for internet service providers (ISPs) such as Comcast or Verizon to come in and ask them to pay for accessing content." On the other hand, the ISPs could slow down or block website content altogether if no one is willing to pay extra. Fry stated that their daily lives rely so heavily on the internet now that access was an important issue. She said it's a big deal. "It's more than just about do

I watch Netflix or Hulu? This is about how do I get the resources I need to be able to participate in our society.”

On the other side of the argument of “net neutrality” sat Montana Public Service Commissioner (MPSC) Travis Kavulla. He was on the panel that oversees telecommunications for the state of Montana. He believed that the internet relied far too much on federal subsidies and that content providers like Netflix, Google and Apple were getting a free ride. He’d like to see those companies picking up the tab. He called it a “content sponsorship model of the deployment of broadband.” He suggested that net neutrality prohibited sponsorship which meant there was less money for innovation and expanding rural access. He believed that getting rid of net neutrality changes that, and would be good for everyone, urban and rural alike.

Kavulla was less concerned about preserving an egalitarian world wide web, and he wonders if that would really be a bad thing, “I mean wouldn't your average rural consumer prefer a high speed broadband network where certain content albeit was preferred over a crappy broadband network where everything is equally slow?” Maybe the answer was already in on that. According to a number of surveys, the vast majority of Americans support keeping net neutrality in place. And states were already taking action. Earlier this year, Montana Governor Steve Bullock, issued an executive order to keep net neutrality in his state. Idaho and Colorado both have legislative efforts underway to accomplish a similar goal (Budner, 2018).

EXHIBIT 1:

Types Of Broadband Connections

According to the FCC, Federal Communications Commission, the term broadband commonly referred to high-speed Internet access that was always on and faster than the traditional dial-up access (FCC, 2014) Broadband included several high-speed transmission technologies such as:

- Digital Subscriber Line (DSL)
- Cable Modem
- Fiber
- Wireless
- Satellite
- Broadband over Powerlines (BPL)

Digital Subscriber Line (DSL) was a wireline transmission technology that transmits data faster over traditional copper telephone lines already installed to homes and businesses. DSL-based broadband provided transmission speeds ranging from several hundred thousand of bits per second (Kbps) to millions of bits per second (Mbps). The availability and speed of your DSL service may have depended on the distance from your home or business to the closest telephone company facility. Signal speed got slower the further it had to go – not unlike water slowing due to friction from pipes.

The following are types of DSL transmission technologies:

- **Asymmetrical Digital Subscriber Line (ADSL)** – Used primarily by residential customers, such as Internet surfers, who receive a lot of data but do not send much. ADSL typically provided faster speed in the downstream direction than the upstream direction.
- **Symmetrical Digital Subscriber Line (SDSL)** – Used typically by businesses, which needed significant bandwidth both upstream and downstream.

Cable modem service enabled cable operators to provide broadband using the same coaxial cables that delivered pictures and sound to your TV set. Most cable modems were external devices that have two connections: one to the cable wall outlet, the other to a computer. They provided transmission speeds of 1.5 Mbps or more. Subscribers could access their cable modem service by simply turning on their computers, without dialing-up an ISP. They could still watch cable TV while using it. Transmission speeds varied depending on the type of cable modem, cable network, and traffic load. Speeds were comparable to DSL.

Fiber optic technology converted electrical signals carrying data to light and sent the light through transparent glass fibers about the diameter of a human hair. Variations of the technology ran the fiber all the way to the customer's home or

business, to the curb outside, or to a location somewhere between the provider's facilities and the customer. Fiber transmitted data at speeds far exceeding current DSL or cable modem speeds, typically by tens or even hundreds of Mbps.

Telecommunications providers sometimes offered fiber broadband in limited areas and have announced plans to expand their fiber networks and offer bundled voice, internet access, and video services.

Wireless broadband connected a home or business to the Internet using a radio link between the customer's location and the service provider's facility. Wireless broadband could be mobile or fixed. Mobile wireless broadband services were also becoming available from mobile telephone service providers and others. These services were generally appropriate for highly-mobile customers and required a special PC card with a built in antenna that plugs into a user's laptop computer. Generally, they provided lower speeds, in the range of several hundred Kbps. Wireless technologies using longer-range directional equipment provided broadband service in remote or sparsely populated areas where DSL or cable modem service would be costly to provide. Speeds were generally comparable to DSL and cable modem. An external antenna was usually required. With reliance on tower transmission, there could be problems associated with access the internet from a fixed point. It often required a direct line-of-sight between the wireless transmitter and receiver.

Satellites orbiting the earth provided necessary links for telephone and television service. They could also provide links for broadband. Satellite broadband was another form of wireless broadband and was also useful for serving remote or sparsely populated areas.

Downstream and upstream speeds for satellite broadband depended on several factors, including the provider and service package purchased, the consumer's line of sight to the orbiting satellite, and the weather. Typically, a consumer could expect to receive (download) at a speed of about 500 Kbps and send (upload) at a speed of about 80 Kbps. These speeds could be slower than DSL and cable modem, but they were about 10 times faster than the download speed with dial-up Internet access. Service could be disrupted in extreme weather conditions.

Broadband over Powerline (BPL) was the delivery of broadband over the existing low- and medium-voltage electric power distribution network. BPL speeds were comparable to DSL and cable modem speeds. BPL could be provided to homes using existing electrical connections and outlets. BPL was an emerging technology in the 2010's, and was available in very limited areas. It had significant potential because power lines were installed virtually everywhere, alleviating the need to

build new broadband facilities for every customer. (US population without electricity is only fractions of a percent.) BPL technology was still developmental (FCC, 2014). BPL appeared years ago to be a logical solution for expanding the availability of broadband internet as power lines naturally cover areas not serviced by DSL or cable. However, several limitations ultimately prevented its adoption as a solution, including cost (Mitchell, 2018).

Most broadband telecommunications networks involved a combination of several infrastructure connectivity elements, and often they were reliant upon a mode of transmission that began with the most redundant and robust type of media.

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