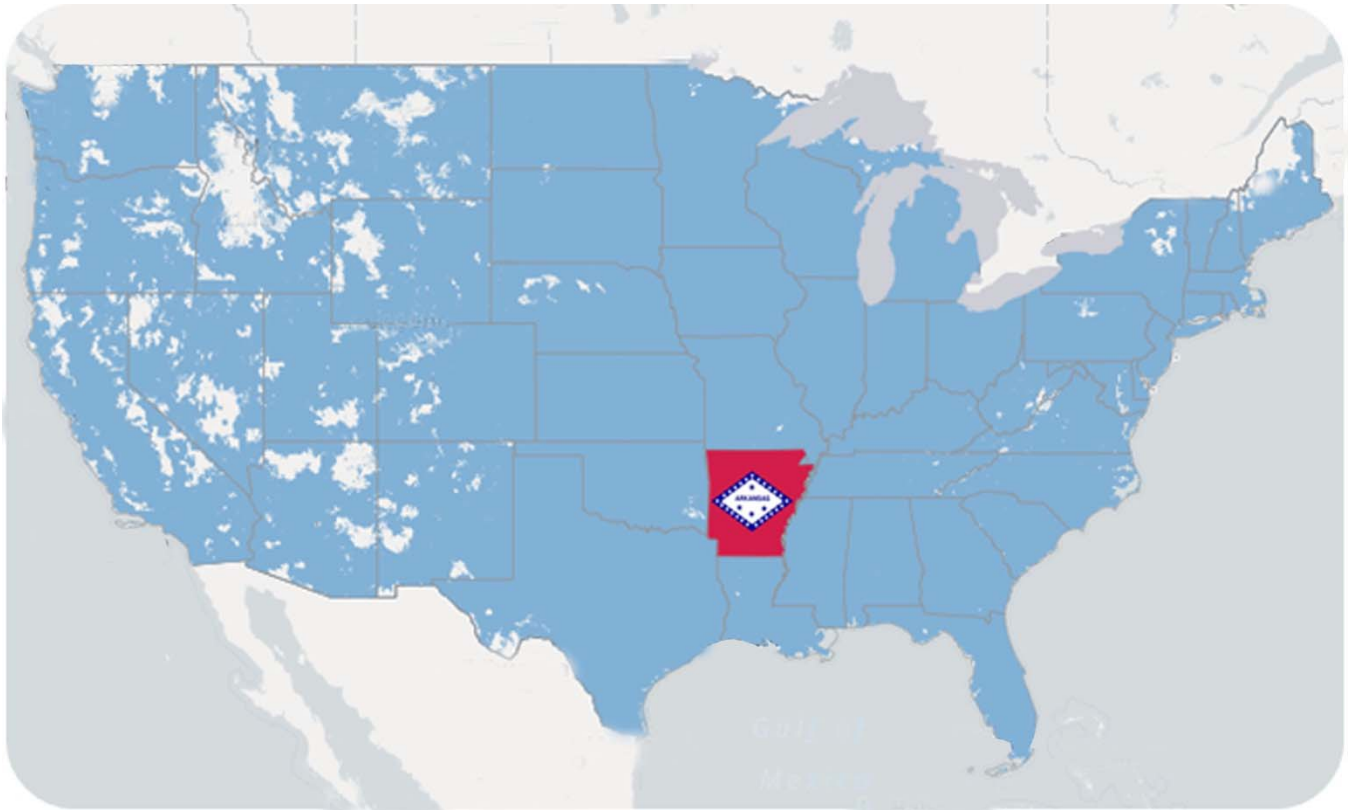


ARKANSAS STATE BROADBAND MANAGER'S REPORT



PERIOD ENDING December 31, 2016

Cover Art: This is the National Broadband Map displaying broadband technologies offered to end users (DSL, cable, wireless, fiber, etc.). This data is created and maintained by the National Telecommunications and Information Administration (NTIA) in collaboration with the Federal Communications Commission (FCC), and in partnership with the 50 states, five territories and the District of Columbia.

Table of Contents

| | |
|--|-----------|
| Executive Summary | 1 |
| Background | |
| What is Broadband? | |
| What are the Types of Broadband? | |
| Why is Broadband Important? | |
| How Important is Broadband Speed? | |
| Key Findings: FCC 2015 Broadband Progress Report | |
| What are the Areas of Focus for Arkansas? | |
| What is the State of Broadband Coverage in Arkansas? | 5 |
| What is the State of Broadband Adoption in Arkansas? | 10 |
| State and Federal Initiatives to Expand Broadband | 11 |
| Private Initiatives to Expand Broadband | 16 |
| Appendix I: | |
| Americans Without Access to Fixed Advanced Telecommunications Capability | 17 |
| Appendix II: | |
| Overall Adoption Rates for Fixed Advanced Telecommunications Capability by State and U.S. Territory | 19 |
| Appendix III: | |
| Internet access service providers with 100 percent of the students they serve meeting the minimum 100 kbps per student needed for digital learning | 21 |
| Appendix IV: | |
| Snapshot of K-12 Connectivity in Arkansas (From May 2016) | 22 |
| Appendix V: | |
| Project Concept and Buildings with State Entities Impacted | 24 |

Executive Summary

Background

Arkansas Code Annotated § 25-4-125 designated the director of the Arkansas Department of Information Systems to serve as the state broadband manager to promote, develop, and coordinate broadband expansion and appropriate broadband infrastructure for all areas of the state. Requirements in the legislation are for the state broadband manager to submit a report on a semiannual basis to the Arkansas Governor's Office, Arkansas Legislative Council, and Joint Committee on Advanced Communications and Information Technology of the activities and operations of the state broadband manager for the preceding six months. The report is to be submitted on or before January 1 and July 1 of each year.

What is Broadband?

Definitions:

- Arkansas's Definition (Act 947 of 2009)- "Broadband" means any service used to provide internet access at a minimum speed that is the greater of:
(A) Seven hundred sixty-eight kilobits per second (768 kbps) in at least one (1) direction; or
(B) The minimum speed for broadband as defined by regulations of the Federal Communications Commission as of January 1, 2009, or as of a later date if adopted by rule of the Arkansas Broadband Advisory Council
- FCC's Definition - (Federal Communications Commission) categorizes an internet service as "broadband" if it transmits at a speed of at least 25 megabits/second (Mbps) for downloading and at least 3 Mbps for uploading
Broadband speed requirements vary for personal use versus use by institutions
- Advanced Telecommunications Capability- The FCC has sometimes used the term "broadband" to refer to "advanced telecommunications capability." The definition of advanced telecommunications capability found within this report is without regard to any transmission media or technology, as high-speed, switched, broadband telecommunications capability that enables users to originate and receive high-quality voice, data, graphics, and video telecommunications using any technology." The term broadband is not equated to advanced telecommunications capability, but the availability of various broadband services that contribute to advanced telecommunications capability is taken into consideration.

Source: https://apps.fcc.gov/edocs_public/attachmatch/FCC-16-6A1.pdf

What are the Types of Broadband?

- Digital Subscriber Line (DSL)
- Cable Modem
- Fiber
- Wireless (Wi-Fi, Mobile, and Fixed Wireless)
- Satellite

Why is Broadband Important?

Broadband is fast becoming of primary importance for

- Citizens
- Education
- Public safety
- Health care
- Economic development
- Government
- Business
- Environmental management

All of which are significant enablers to economic growth, delivery of services and quality of life.

How Important Is Broadband Speed?

The FCC definition of broadband speed changes as technologies continue to evolve. In its 2015 Broadband Progress Report, the FCC indicated that advances in technology, market offerings by broadband providers and consumer demand prompted updating broadband benchmark speeds to 25 Mbps for downloads and 3 Mbps for uploads. The commission found that speeds established in 2010 were outdated and inadequate for evaluating whether advanced broadband is being efficiently deployed to Americans.

Source: <https://www.fcc.gov/reports/2015-broadband-progress-report>

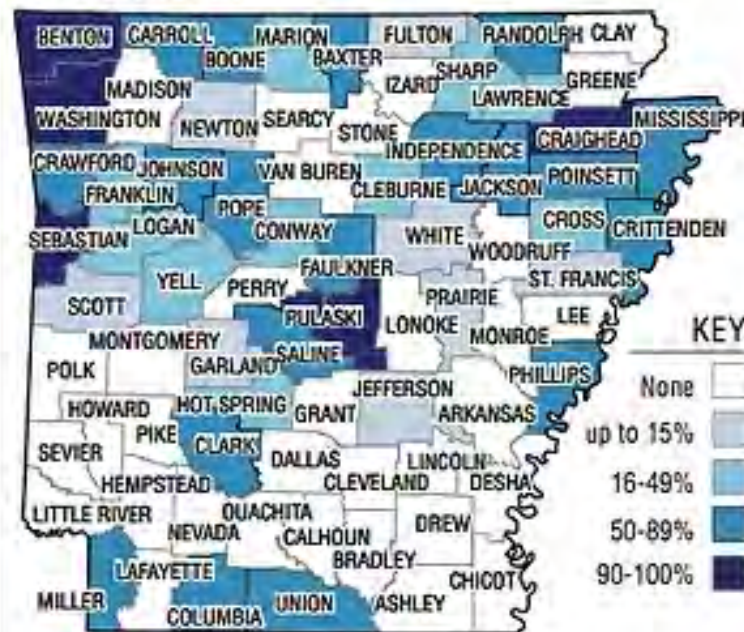
| What Do You Want/Need To Do Online? | | | | What Speed Do You Need ? | | | | | |
|-------------------------------------|---|---|---|--------------------------|--------|--------|---------|---------|----------|
| | | | | 1.5 Mbps | 3 Mbps | 5 Mbps | 10 Mbps | 20 Mbps | 20+ Mbps |
| Web Surfing | | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Email |  |  |  | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Online Shopping | | | | | | | | | |
| Internet Phone |  |  |  | | ✓ | ✓ | ✓ | ✓ | ✓ |
| Music Streaming | | | | | | | | | |
| Short Video Clips | | | | | | | | | |
| SD Video Streaming | | | | | | ✓ | ✓ | ✓ | ✓ |
| Skype |  |  |  | | | ✓ | ✓ | ✓ | ✓ |
| Facetime | | | | | | | | | |
| Online Video Gaming |  |  |  | | | | ✓ | ✓ | ✓ |
| HD Video Streaming | | | | | | | | | |
| Online Education | | | | | | | | | |
| Multiple Heavy Users |  |  |  | | | | | ✓ | ✓ |
| Smart Home | | | | | | | | | |
| Video Surveillance | | | | | | | | | |
| Telemedicine |  |  |  | | | | | | ✓ |
| Video Conferencing | | | | | | | | | |
| Super Computing | | | | | | | | | |

Source: <http://www.teammidwest.com/wp-content/uploads/2013/10/What-Speed-Do-You-Need.jpg>

Broadband Speeds in Arkansas

Broadband speeds in Arkansas

Three telecommunications companies will be paid by the federal government to provide high-speed Internet access to many Arkansans who lack it. The mandated download speed they must provide is 10 megabits per second. But the Federal Communications Commission defines broadband as 25 megabits per second. This map shows where speed of at least 25 mbps is available in the state.



SOURCE: Broadbandnow.com

Arkansas Democrat-Gazette

SOURCE: Broadbandnow.com

Credit: Arkansas Democrat-Gazette

Map showing Broadband speeds in Arkansas

Source: <http://www.nwaonline.com//news/2016/nov/27/state-in-national-test-of-wireless-inte/>

| Median Download Broadband Speeds in Arkansas | | |
|--|------------------|--------------|
| Location | Cumulative Tests | Median Speed |
| Home | 4,373 | 4.8 Mbps |
| Schools, Libraries, Community Centers | 100 | 7.6 Mbps |
| Medium/Large Business | 157 | 10.1 Mbps |
| Small Business | 312 | 4.2 Mbps |
| Mobile | 16,244 | 2.0 Mbps |

| Arkansas's National Ranking for Access to Broadband Speeds | | | |
|--|--------------------------|--------------------------|--------------------------|
| | 2015 National Ranking | 2014 National Ranking | 2013 National Ranking |
| Speed | 34 th | 41 st | 41 st |
| Speed: The state's speed ranking indicates the percent of the population with access to various download/upload speeds compared to the nation's population. | | | |

Key Findings: FCC 2016 Broadband Progress Report

- 10 percent of all Americans (34 million people) lack access to 25 Mbps/3 Mbps service.
- 39 percent of rural Americans (23 million people) lack access to 25 Mbps/3 Mbps.
- Only 4 percent of urban Americans lack access to 25 Mbps/3 Mbps broadband.

Source: https://apps.fcc.gov/edocs_public/attachmatch/FCC-16-6A1.pdf

What are the Areas of Focus for Arkansas?

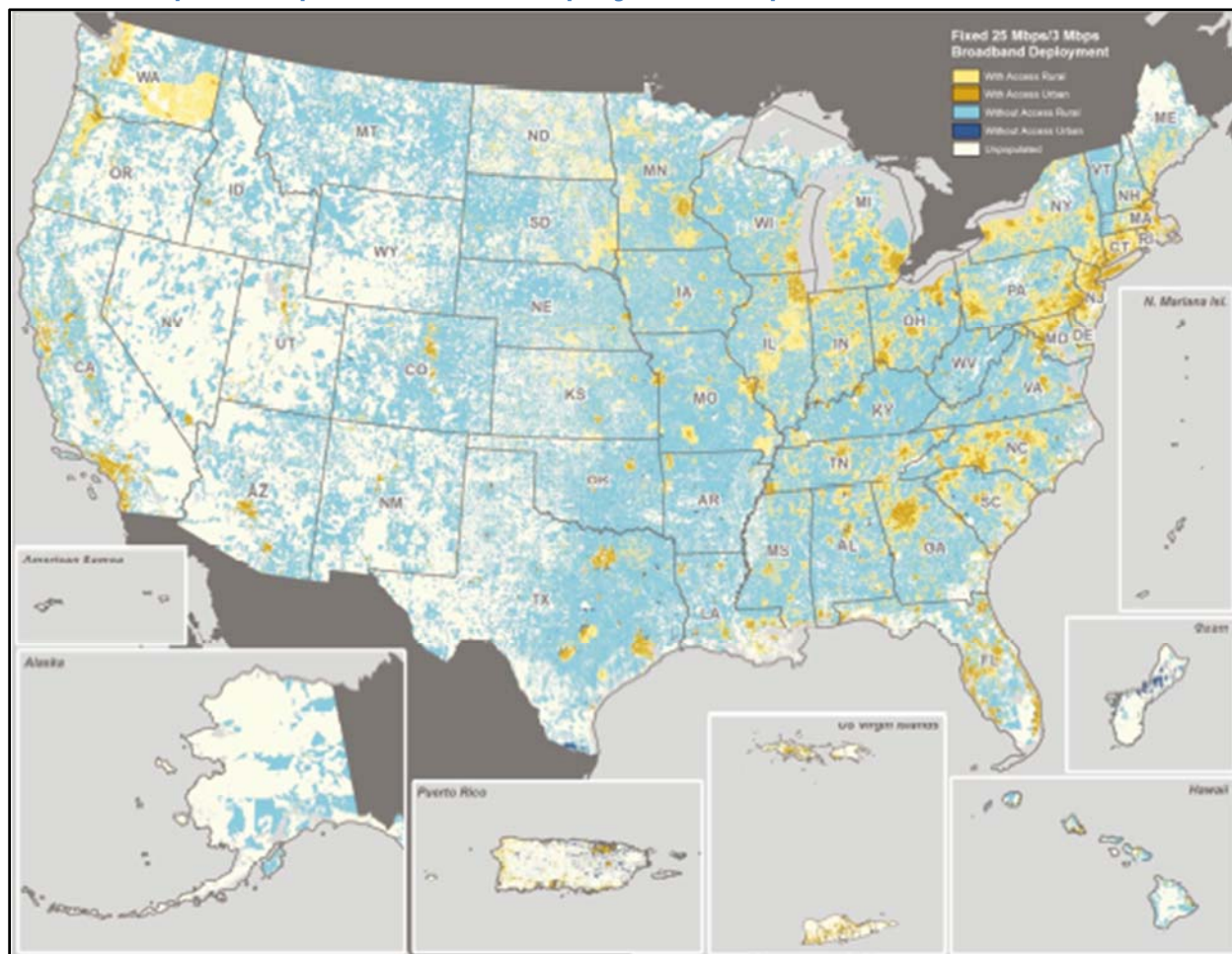
- **Availability**
Broadband is available if it is accessible to accomplish all necessary goals regardless of the nature of those goals (business or educational, economic or legislatively mandated).
- **Affordability**
Broadband is affordable if it is both affordable to the consumer to purchase and for the provider to offer.
- **Adequacy**
Broadband is considered adequate if it provides enough bandwidth to meet the personal, business, educational, and economic development needs of each constituency and is capable of expansion to meet future needs.

What is the State of Broadband Coverage in Arkansas?

The FCC released a report January 29, 2016, entitled Broadband Availability in America. According to report data, Americans residing in the states with the lowest population density are 10 times more likely to lack access to broadband than Americans residing in the states with the highest density.

Source: https://apps.fcc.gov/edocs_public/attachmatch/FCC-16-6A1.pdf

FCC 25 Mbps/3 Mbps Broadband Deployment Map



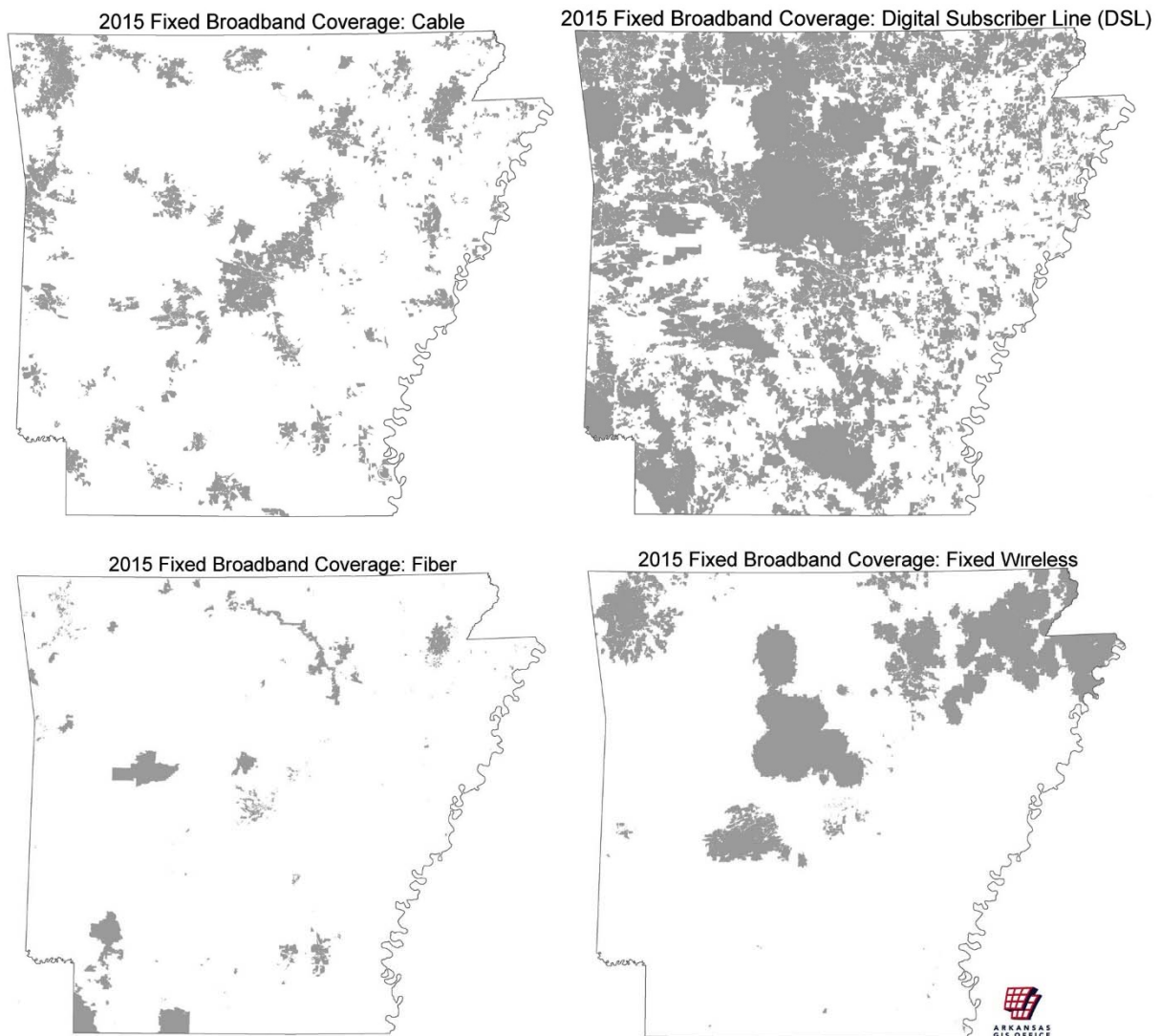
Major broadband mapping results in Arkansas were accomplished by Connect Arkansas. Connect Arkansas was the state's designated grantee that received a share of \$293 million from the National Telecommunications and Information Administration's (NTIA) State Broadband Initiative.

In addition to broadband mapping, Connect Arkansas used this funding to support a number of broadband-related initiatives including surveys to better understand barriers to broadband adoption and to create initiatives to expand adoption by Arkansans.

The NTIA reports that more than 50 percent of the grant funds were used to gather data twice a year on the availability, speed, and location of broadband services, as well as the broadband services for community institutions, such as schools, libraries and hospitals. That data was used to populate the National Broadband Map through June 2014, the most recent edition of the map.

The FCC requested additional funding to maintain and update the National Broadband Map, but this request was not granted. With federal grant funds exhausted, Connect Arkansas requested funding from the state to continue operations, but this request was not granted and the organization dissolved in 2015.

Broadband Coverage by Technology (Cable, DSL, Fiber and Fixed Wireless)

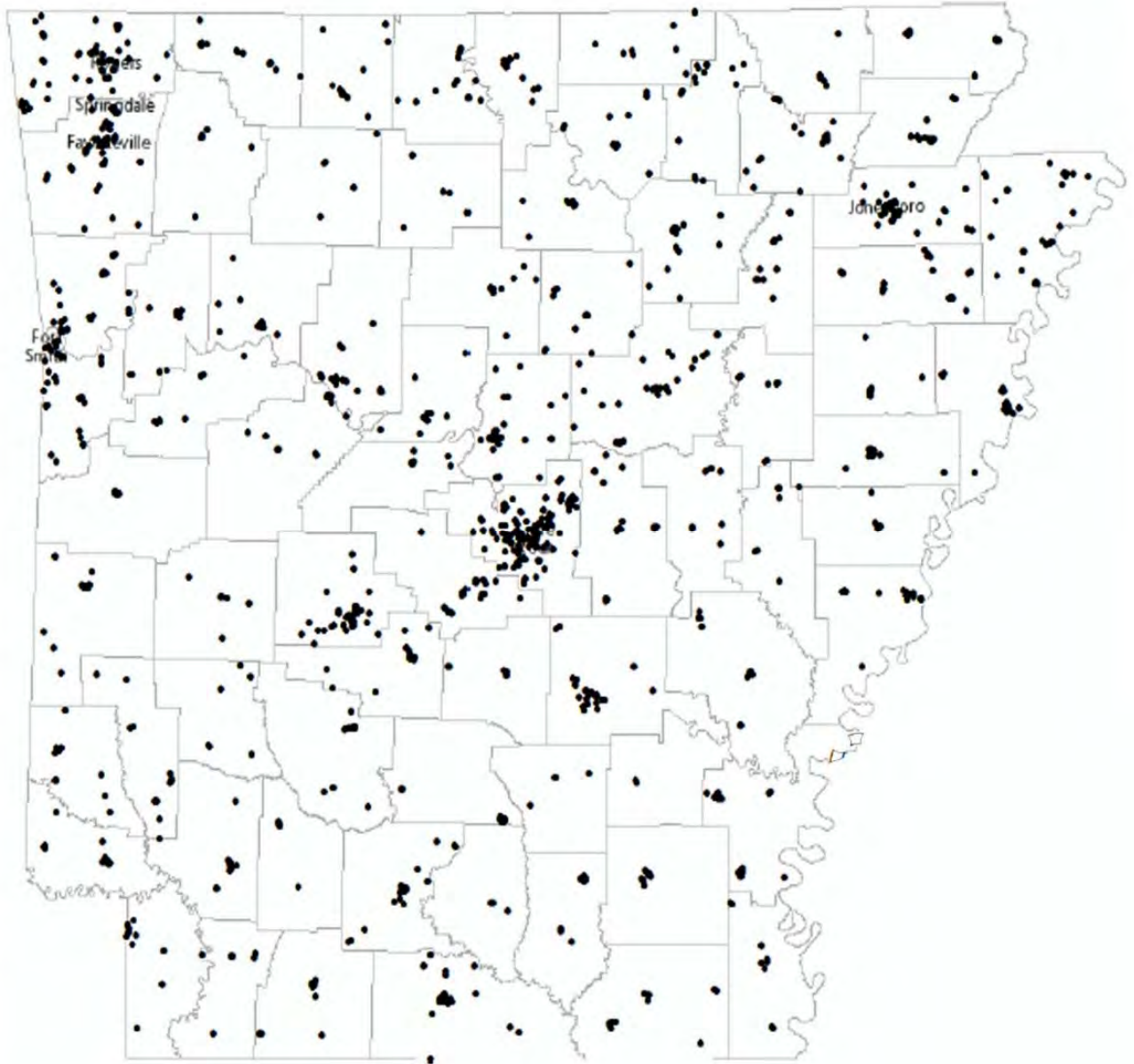


Broadband data sourced from <https://www.fcc.gov/general/broadband-deployment-data-fcc-form-477>

FCC Form 477 data cao December 31, 2015, excluding undisclosed revisions made between 8.29.16-10.12.16

State Community Anchor Institutions

The dots on this map are state government locations including schools, libraries and other governmental entities where broadband exists.



Fixed Broadband

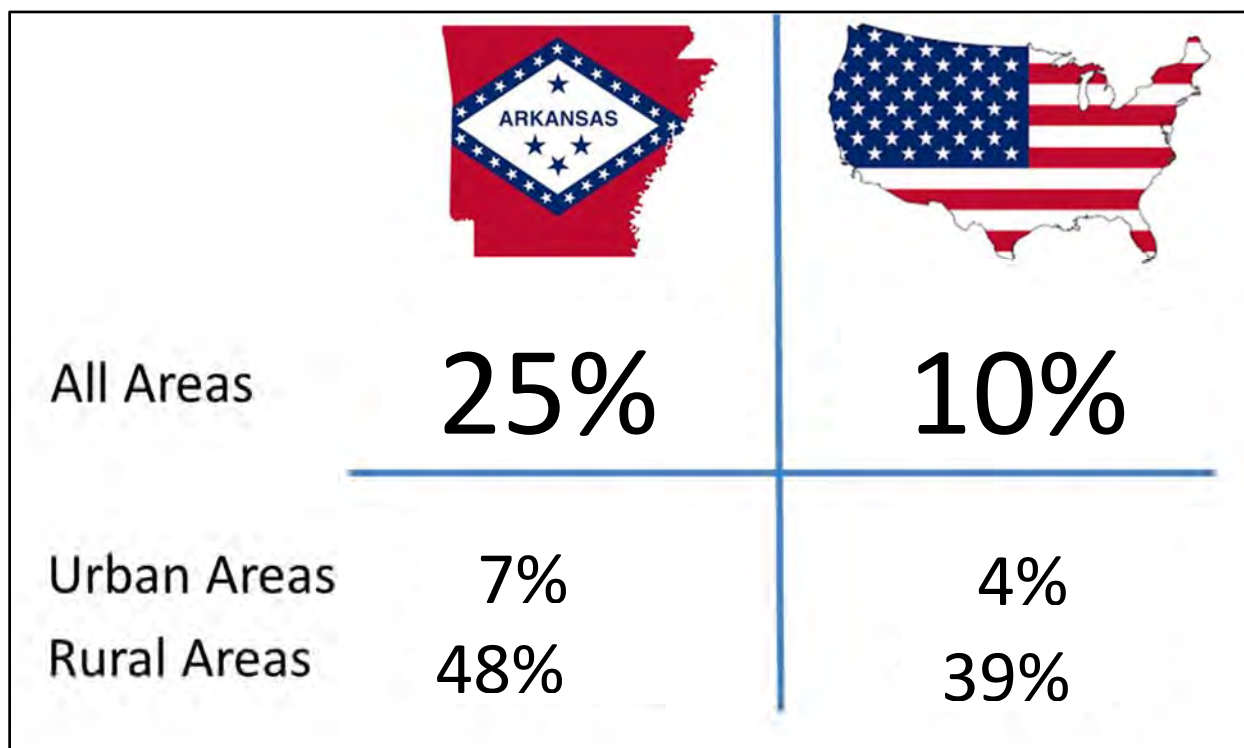
Fixed broadband services generally require a physical transmission path to connect a user to the internet. Examples include coaxial cable, copper wire, or fiber-optic cable. Cable modem service is the most common fixed broadband service in the United States, accounting for approximately 59 percent of all fixed broadband service subscriptions. Cable, DSL, and fiber, collectively represent approximately 97 percent of the fixed broadband market.

Consumers use fixed broadband service for high capacity home use, including streaming high definition (HD) video, uploading large files and certain web services.

Source: https://apps.fcc.gov/edocs_public/attachmatch/FCC-16-6A1.pdf

This chart, created from data cited in the 2016 Broadband Progress Report, compares the population of Arkansans without access to fixed advanced telecommunications capability compared to the nation's population.

Arkansans without Access to Fixed Advanced Telecommunications Capability Compared to the U.S. Population



Source: https://apps.fcc.gov/edocs_public/attachmatch/DOC-331734A1.pdf

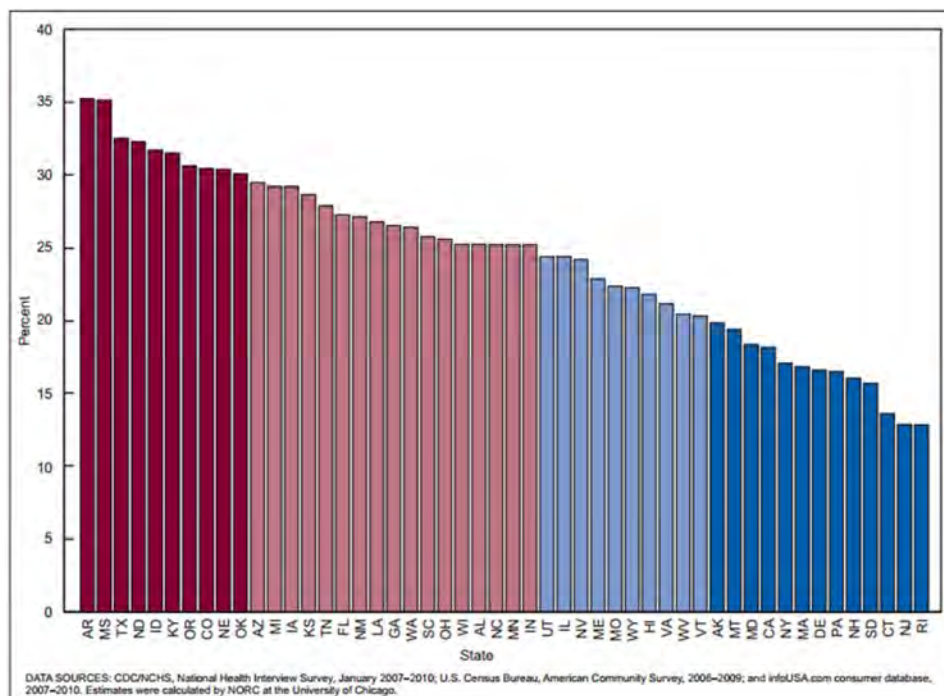
Appendix I: Americans without Access to Fixed Advanced Telecommunications Capability by State and U.S. Territory

Mobile Broadband

Mobile devices have become an indispensable tool of daily life that serve in a personal as well as a business capacity. Smartphones and tablets commonly rely upon mobile broadband services for texting, email, social media, and entertainment applications. At home, work or traveling, mobile devices are also most likely to be used to call 9-1-1 in emergency situations. The smartphone share of mobile phones in the U.S. increased to 77 percent in November 2015 from 50 percent two years earlier.

In a National Health Statistics Report by the Center for Disease Control (CDC) presenting state-level estimates of the percentage of adults and children living in households that did not have a landline telephone, but did have at least one wireless telephone, Arkansas led the nation.

This report revealed 35.2 percent of Arkansans were abandoning landline telephones in favor of cellphones. CDC research found that lower-income people, younger people and renters are more likely to have only wireless phones.



Source: https://apps.fcc.gov/edocs_public/attachmatch/FCC-16-6A1.pdf
<http://www.cdc.gov/nchs/data/nhsr/nhsr039.pdf>

What is the State of Broadband Adoption in Arkansas?

Cost continues to be the number one obstacle for broadband adoption at home. A study of barriers to broadband adoption by Pew Research Center pointed to multiple factors for why residents do not subscribe to high-speed service at home.

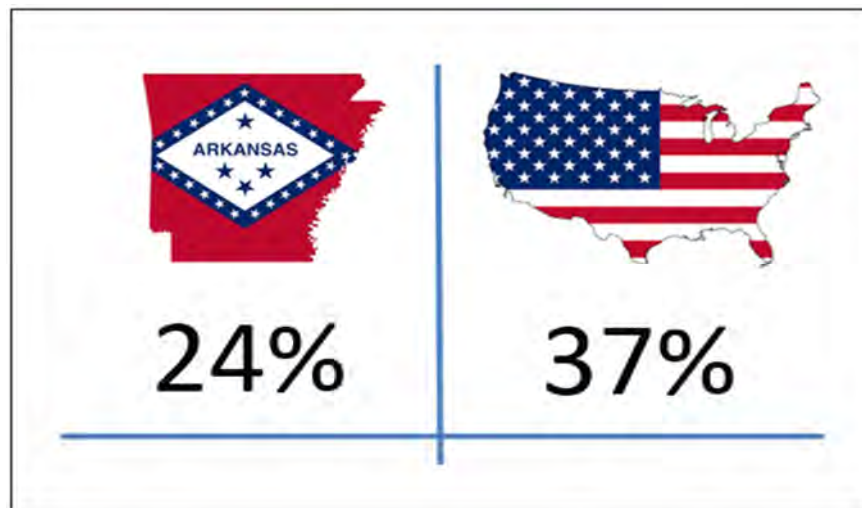
- Monthly cost of a broadband subscription is too much
- Cost of a computer
- Functionality of mobile devices rivals the monthly cost of in-home broadband makes traditional broadband a lesser priority
- Lack of access to suitable broadband service in their area

A majority (65 percent) of non-adopters said that a lack of home broadband is a major disadvantage of some sort.

As evidenced in the chart below, Arkansas continues to lag behind the nation in the overall adoption rate of at home or fixed broadband.

Source: <http://www.pewinternet.org/2015/12/21/3-barriers-to-broadband-adoption-cost-is-now-a-substantial-challenge-for-many-non-users/>

Overall Adoption Rates for Fixed Advanced Telecommunications Capability for Arkansas Compared to the U.S. Population



Source: https://apps.fcc.gov/edocs_public/attachmatch/DOC-331734A1.pdf

Appendix II: Overall Adoption Rates for Fixed Advanced Telecommunications Capability by State and U.S. Territory

State and Federal Initiatives to Expand Broadband

Arkansas Public School Computer Network (APSCN)

A top priority for Governor Asa Hutchinson, the Arkansas Department of Education, and the Arkansas Department of Information Systems (DIS) is ensuring that the state's K-12 public schools have sufficient high-speed broadband services. In early 2015, 58 percent of Arkansas districts were meeting the FCC's internet access target of 100 Kbps/student. However, the governor, ADE and DIS set forth a lofty goal for **100 percent** of Arkansas schools to reach 200 Kbps/student of highly secure, E-rate eligible, state funded, high speed broadband connectivity.

An invitation for bid was opened March 9, 2015. Contracts were awarded to 22 telecommunications providers. Work began to upgrade the Arkansas Public School Computer Network (APSCN) to a statewide aggregated network delivered over fiber optic cable to serve the state's schools and education cooperatives.

Fort Smith became the first school district in the state to connect to the upgraded high speed network in July 2015. By December 31, 2015, 42 school districts and education cooperatives were functioning on the upgraded broadband Arkansas Public School Computer Network (APSCN). Most recent data indicates that nearly 95 percent of the state's schools now either meet or exceed the FCC's internet access target, according to EducationSuperHighway. Ninety-four percent of schools have fiber connections to keep up with growing demand for bandwidth.

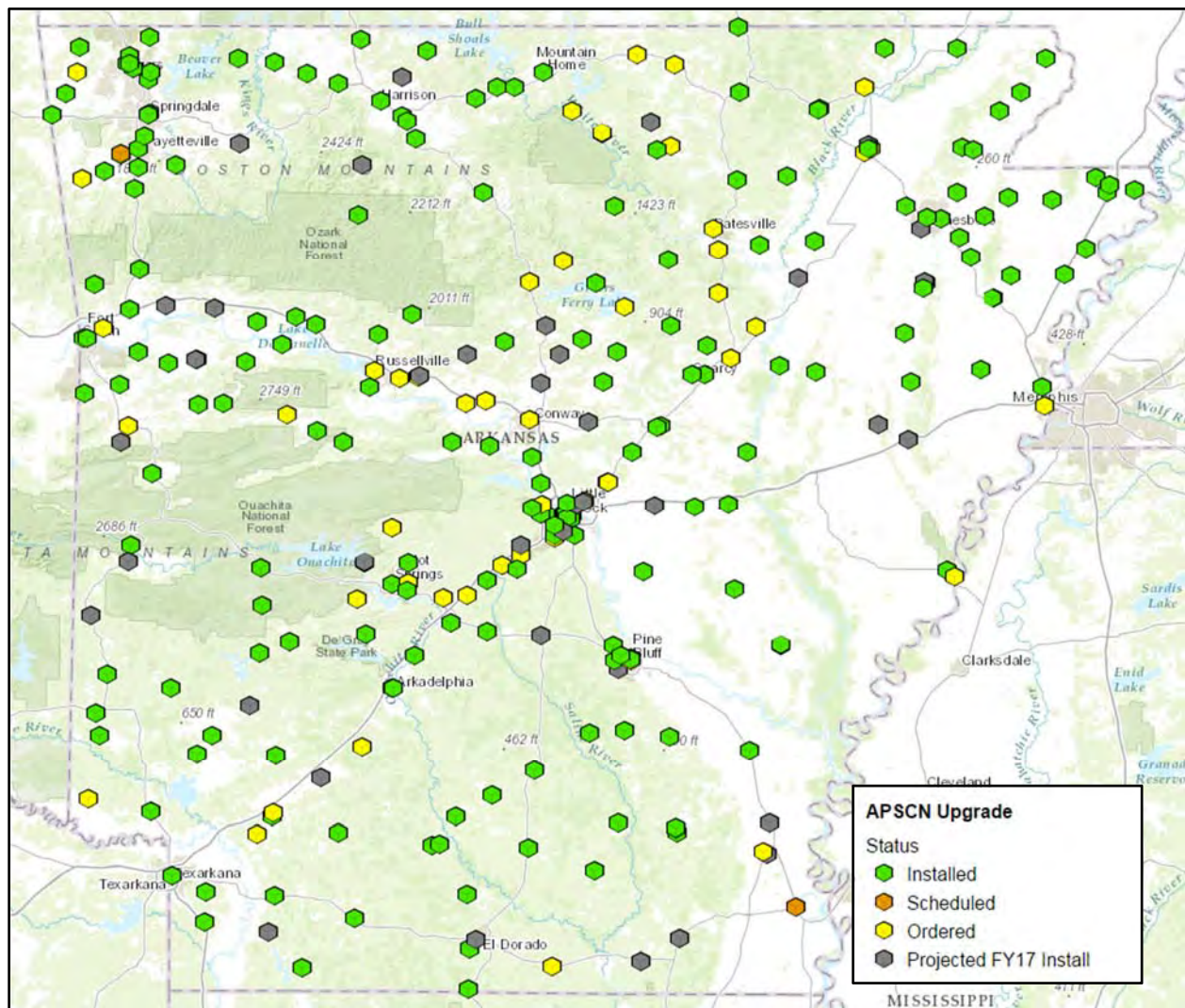
As of December 31, 2016, over 200 of the state's 276 districts within the K-12 system have been upgraded to highly secure, E-rate eligible, high speed broadband delivered over fiber optic cable. This project is expected to be completed by July 1, 2017.

Appendix III: Internet access service providers with 100 percent of the students they serve meeting the minimum 100 kbps per student needed for digital learning

Source: <http://www.compareandconnectk12.org/2016/AR>

Appendix IV: Snapshot of K-12 Connectivity in Arkansas from EducationSuperHighway

DIS, in partnership with the Arkansas Geographic Information Systems Office, developed an interactive map to tracking the progress of the APSCN broadband upgrade. The map can be found at the following link <https://gis.arkansas.gov/dis/viewer/apscn/index.html>.



Dark Fiber Transport Services

The Department of Information Systems (DIS) issued an Invitation for Bid (IFB) through the Office of State Procurement, November 9, 2016, to obtain pricing and contract(s) for dark fiber transport services. The deployment of the dark fiber will create a High Speed Optical Network accommodating speeds of 10, 40, and 100 Gigabit Ethernet. This will encompass two fiber rings connecting the state's two data centers and other state buildings having a need for bandwidth and equipped with emergency power.

Appendix V: Project Concept and Buildings with State Entities Impacted

Border to Border Broadband

In October 2015, state lawmakers announced that, by October 2016, a plan would be prepared to connect every home and business in the state to high-speed broadband internet. The Joint Committee for Advanced Communications and Information Technology voted to find solutions and develop legislation to fix the problem. Members of the committee have also visited rural communities to learn more about challenges to broadband connectivity.

Meeting, January 25, 2016, at the University of Arkansas-Hope-Texarkana

Speaker 1: Stacy Eads, area manager, Hope Community TV-Prescott, a video-internet provider serving Hope, Camden and Prescott.

Speaker 2: Bob Young, vice president of engineering, WEHCO Cable, an internet service provider for Hope Community Television

Speaker 3: Johnny Ross, general manager, Walnut Hill Telephone Company

Speaker 4: David Wall with Cable ONE, Home Cable Service

Broadband Challenges Identified:

- Expense of the cost to install and maintain fiber in rural communities
- Increase in pole attachment fees charged by smaller electric cooperative companies. Eads cited an example in which the pole attachment fee increased from \$5 to \$27 per pole attachment
- Lack of homes/potential customers located on rural roads and highways
- Increasing reliance of rural residents upon wireless technology

Source:

<http://www.arkleg.state.ar.us/assembly/2015/Meeting%20Attachments/685/I14265/EXHIBIT%20C-3.pdf>

Meeting, February 19, 2016, at the Southeast Arkansas Education Service Cooperative, Monticello

Speaker 1: Mark Lundy, consultant, South Arkansas Telephone Company

Speaker 2: Bill Hegmann, general manager, Southwest Arkansas Telephone Cooperative

Speaker 3: Donnie Weast, owner, City Wireless

Speaker 4: Charlie Hembree, representative, Vyve Broadband Company

Broadband Challenges Identified:

- Low population/potential customer base
- Accessibility to towers and affordable equipment
- Finding a direct path to small communities and getting data to the information highway

Source:

<http://www.arkleg.state.ar.us/assembly/2015/Meeting%20Attachments/685/I14332/Approved%20Minutes%202-19-16.pdf>

Meeting, March 17, 2016, at Arkansas State University, Jonesboro

Speaker 1: Alan Morse, president, Ritter Communications Holdings

Speaker 2: Michael Zarrilli, vice president for governmental relations, Suddenlink

Speaker 3: Bart Rowe, information technology director, Paragould Light Water and Cable

Broadband Challenges Identified:

- Cost to establish infrastructure in rural areas, especially rugged terrain
- Lack of return on investment
- Lack of funding sources

Source: <http://talkbusiness.net/2016/03/arkansas-legislative-committee-hears-about-rural-broadband-cost-issues/>

Minutes from additional meetings were unavailable. A final report or plan was not presented in the October 2016 timeframe as indicated.

Arkansas Public Service Commission Adopts Pole Attachment Rules for Broadband Deployment

The Arkansas Public Service Commission adopted a comprehensive set of new pole attachment rules that apply broadly to providers of electric, telecommunications, cable television, internet access, and other information services, and govern access to telephone, electric distribution and dual-use transmission poles, as well as conduit, owned by the state's investor-owned and cooperatively-organized utilities. The rules were adopted pursuant to a year-long rulemaking that included dozens of electric companies and cooperatives, and the telecommunications and cable industries.

Source: <http://www.lexology.com/library/detail.aspx?g=004e6e8e-5e19-460c-9012-7acbc4f2a196>

Arkansas Senator Leads Efforts to Strengthen Rural Broadband

Arkansas Senator John Boozman pushed for increased access to broadband in rural and underserved areas. Boozman helped launch a Senate Broadband Caucus.

Source:

http://www.boozman.senate.gov/public/index.cfm/files/serve?File_id=679872D8-F272-4676-81C8-9A7984B26D55

Broadband Action Plan Details Strategies for Connecting Anchor Institutions Access to Gigabit Internet Speeds

The Schools, Health and Libraries Broadband Coalition, a group representing community anchor institutions as well as private companies and internet-focused nonprofits released a Broadband Action Plan. The plan encompasses a series of 10 policy papers to get anchor institutions connected to gigabit speeds.

Source: <http://www.shlb.org/news/shlb/2016/07/Community-Anchor-Institutions-Broadband-to-the-People/>

Link to full plan:

http://www.shlb.org/uploads/G2G/Broadband%20Action%20Plan_SHLB.pdf

FCC-Launches Broadband Health Mapping Tool

The FCC's Connect2Health Task Force (C2H) unveiled a new mapping tool in support of its efforts to further chart the broadband future of health care. The tool allows users to visualize, overlay and analyze broadband and health data at the national, state and county levels. The maps are an interactive experience, enabling detailed study of the intersection between connectivity and health for every county in the United States.

Source: <https://www.fcc.gov/health/maps>

Private Initiatives to Expand Broadband

Ozarks Electric Cooperative Begins First Phase of High-Speed, Fiber Optic Connections to Service Area

OzarksGo, LLC, is a telecommunications subsidiary of Ozarks Electric Cooperative, offering all-fiber gigabit Internet and premium television and telephone services to Northwest Arkansas and Northeast Oklahoma.

Source: <https://www.ozarksgo.net/about>

Pinnacle, Newroads Join on Project to Build Out Fiber Optic Network

The joint venture will operate under the name Pinnacle Telecom. The companies will provide voice and data service in the Fort Smith regions and surrounding areas serving a combined total of 4,000 business and residential customers.

Source: <http://talkbusiness.net/2016/07/pinnacle-newroads-telecom-merge-to-form-a-company-with-4000-fort-smith-metro-customers/>

Appendix I

Americans without Access to Fixed Advanced Telecommunications Capability by State and U.S. Territory

| | All Areas | | Urban Areas | | Rural Areas | |
|--|---------------------|-----------|---------------------|-----------|---------------------|-----------|
| | Pop. Without Access | % of Pop. | Pop. Without Access | % of Pop. | Pop. Without Access | % of Pop. |
| United States | 33,981,660 | 10% | 10,551,623 | 4% | 23,430,037 | 39% |
| States and District of Columbia | 31,353,263 | 10% | 9,001,161 | 3% | 22,352,102 | 38% |
| Alabama | 985,263 | 20% | 169,154 | 6% | 816,109 | 41% |
| Alaska | 194,375 | 26% | 26,389 | 5% | 167,986 | 67% |
| Arizona | 898,724 | 13% | 487,930 | 8% | 410,794 | 63% |
| Arkansas | 744,572 | 25% | 128,125 | 7% | 616,447 | 48% |
| California | 2,017,166 | 5% | 920,182 | 2% | 1,096,984 | 61% |
| Colorado | 539,327 | 10% | 180,754 | 4% | 358,573 | 53% |
| Connecticut | 47,464 | 1% | 42,220 | 1% | 5,244 | 1% |
| Delaware | 29,789 | 3% | 13,355 | 2% | 16,434 | 10% |
| District of Columbia | 10,539 | 2% | 10,539 | 2% | | |
| Florida | 1,297,648 | 7% | 795,839 | 4% | 501,809 | 29% |
| Georgia | 932,484 | 9% | 306,414 | 4% | 626,070 | 25% |
| Hawaii | 26,201 | 2% | 2,001 | 0% | 24,200 | 22% |
| Idaho | 301,118 | 18% | 47,922 | 4% | 253,196 | 55% |
| Illinois | 1,188,012 | 9% | 419,780 | 4% | 768,232 | 56% |
| Indiana | 1,131,373 | 17% | 220,696 | 5% | 910,677 | 52% |
| Iowa | 451,148 | 15% | 76,830 | 4% | 374,318 | 37% |
| Kansas | 436,249 | 15% | 123,315 | 5% | 312,934 | 49% |
| Kentucky | 699,360 | 16% | 73,542 | 3% | 625,818 | 34% |
| Louisiana | 881,763 | 19% | 282,361 | 8% | 599,402 | 50% |
| Maine | 162,563 | 12% | 20,362 | 4% | 142,201 | 17% |
| Maryland | 262,002 | 4% | 166,879 | 3% | 95,123 | 13% |
| Massachusetts | 183,103 | 3% | 129,783 | 2% | 53,320 | 10% |
| Michigan | 1,153,387 | 12% | 245,299 | 3% | 908,088 | 37% |
| Minnesota | 641,787 | 12% | 59,140 | 1% | 582,647 | 43% |
| Mississippi | 1,034,047 | 34% | 129,674 | 9% | 904,373 | 60% |
| Missouri | 1,257,622 | 20% | 204,409 | 5% | 1,053,213 | 61% |
| Montana | 317,581 | 31% | 54,888 | 9% | 262,693 | 61% |
| Nebraska | 304,018 | 16% | 94,847 | 6% | 209,171 | 51% |
| Nevada | 249,722 | 8% | 151,168 | 5% | 98,554 | 65% |
| New Hampshire | 99,129 | 7% | 22,094 | 3% | 77,035 | 15% |

| | All Areas | | Urban Areas | | Rural Areas | |
|--------------------------|---------------------|-----------|---------------------|-----------|---------------------|-----------|
| | Pop. Without Access | % of Pop. | Pop. Without Access | % of Pop. | Pop. Without Access | % of Pop. |
| New Jersey | 285,478 | 3% | 188,462 | 2% | 97,016 | 21% |
| New Mexico | 431,125 | 20% | 156,432 | 9% | 274,693 | 61% |
| New York | 430,202 | 2% | 40,455 | 0% | 389,747 | 17% |
| North Carolina | 738,306 | 7% | 77,082 | 1% | 661,224 | 20% |
| North Dakota | 97,315 | 14% | 11,294 | 2% | 86,021 | 37% |
| Ohio | 983,927 | 8% | 202,958 | 2% | 780,969 | 31% |
| Oklahoma | 1,066,854 | 27% | 247,333 | 9% | 819,521 | 66% |
| Oregon | 416,102 | 10% | 150,759 | 5% | 265,343 | 37% |
| Pennsylvania | 803,645 | 6% | 270,708 | 3% | 532,937 | 20% |
| Rhode Island | 17,996 | 2% | 15,757 | 2% | 2,239 | 2% |
| South Carolina | 852,483 | 18% | 247,842 | 8% | 604,641 | 38% |
| South Dakota | 92,406 | 11% | 9,962 | 2% | 82,444 | 26% |
| Tennessee | 834,545 | 13% | 106,128 | 2% | 728,417 | 34% |
| Texas | 2,976,879 | 11% | 1,216,234 | 5% | 1,760,645 | 46% |
| Utah | 180,004 | 6% | 77,530 | 3% | 102,474 | 39% |
| Vermont | 106,615 | 17% | 5,223 | 2% | 101,392 | 27% |
| Virginia | 925,477 | 11% | 186,349 | 3% | 739,128 | 38% |
| Washington | 200,320 | 3% | 48,339 | 1% | 151,981 | 14% |
| West Virginia | 554,124 | 30% | 92,104 | 10% | 462,020 | 48% |
| Wisconsin | 744,002 | 13% | 33,517 | 1% | 710,485 | 43% |
| Wyoming | 137,922 | 23% | 10,802 | 3% | 127,120 | 63% |
| U.S. Territories | 2,628,397 | 66% | 1,550,462 | 54% | 1,077,935 | 98% |
| American Samoa | 54,504 | 100% | 41,307 | 100% | 13,197 | 100% |
| Guam | 159,377 | 99% | 107,044 | 99% | 52,333 | 100% |
| Northern Mariana Islands | 51,455 | 100% | 33,906 | 100% | 17,549 | 100% |
| Puerto Rico | 2,259,097 | 62% | 1,325,683 | 50% | 933,414 | 98% |
| U.S. Virgin Islands | 103,964 | 100% | 42,522 | 100% | 61,442 | 100% |

Appendix II

Overall Adoption Rates for Fixed Advanced Telecommunications Capability by State and U.S. Territory

| | 25 Mbps/3 Mbps |
|----------------------|----------------|
| United States | 37% |
| Alabama | 25% |
| Alaska | 3% |
| Arizona | 45% |
| Arkansas | 24% |
| California | 43% |
| Colorado | 52% |
| Connecticut | 43% |
| Delaware | * |
| District of Columbia | * |
| Florida | 37% |
| Georgia | 35% |
| Hawaii | * |
| Idaho | 25% |
| Illinois | 40% |
| Indiana | 30% |
| Iowa | 6% |
| Kansas | 26% |
| Kentucky | 8% |
| Louisiana | 36% |
| Maine | 13% |
| Maryland | 59% |
| Massachusetts | 68% |
| Michigan | 40% |
| Minnesota | 42% |
| Mississippi | 26% |
| Missouri | 27% |
| Montana | * |
| Nebraska | 34% |
| Nevada | * |
| New Hampshire | 56% |
| New Jersey | 58% |
| New Mexico | 30% |
| New York | 39% |
| North Carolina | 16% |

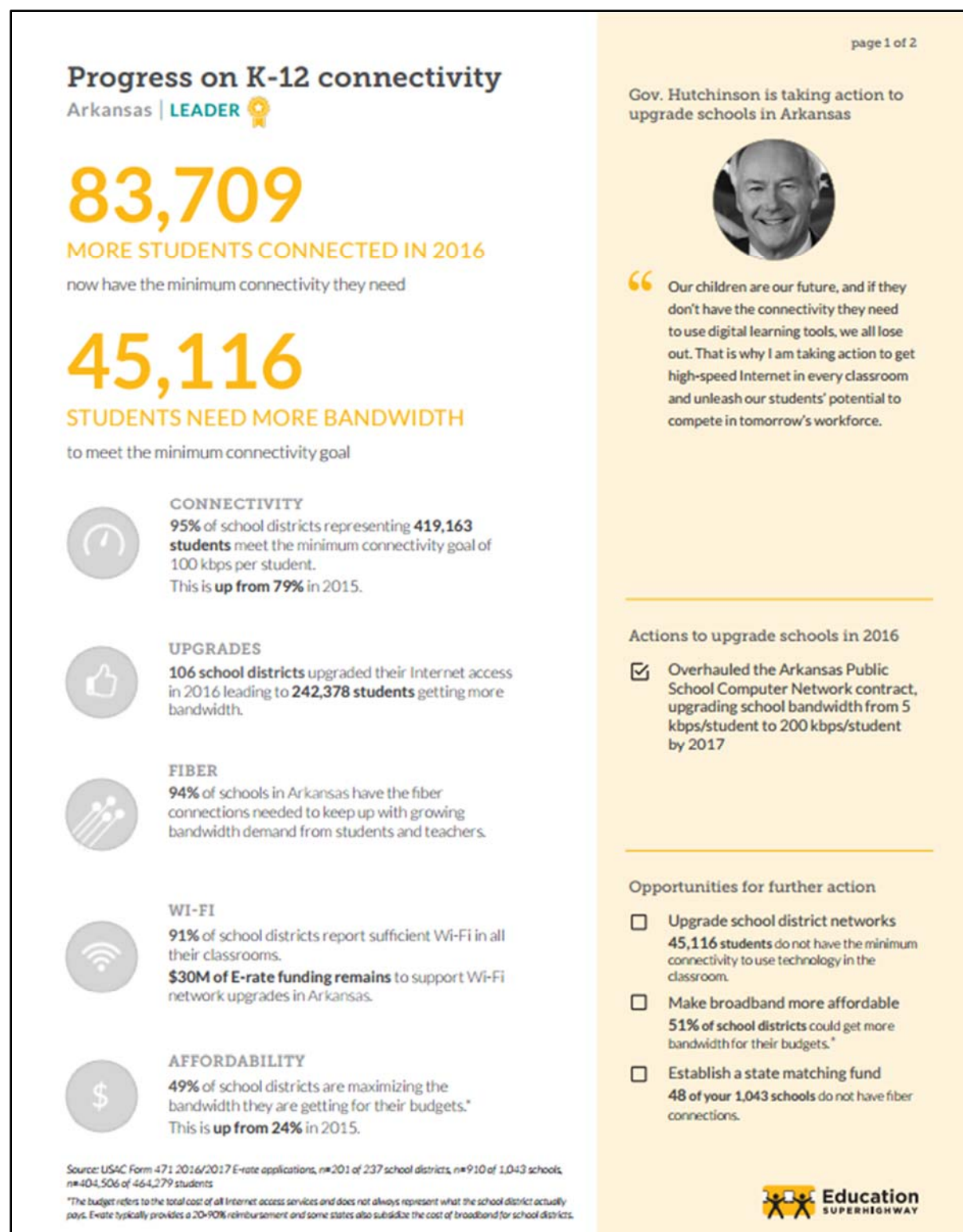
| | 25 Mbps/3 Mbps |
|---|----------------|
| North Dakota | 45% |
| Ohio | 11% |
| Oklahoma | 34% |
| Oregon | 49% |
| Pennsylvania | 46% |
| Rhode Island | * |
| South Carolina | 23% |
| South Dakota | 40% |
| Tennessee | 40% |
| Texas | 26% |
| Utah | 41% |
| Vermont | 51% |
| Virginia | 53% |
| Washington | 52% |
| West Virginia | 46% |
| Wisconsin | 24% |
| Wyoming | 46% |
| U.S. Territories | 4% |
| American Samoa | NA |
| Guam | * |
| Northern Mariana Islands | NA |
| Puerto Rico | 0% |
| U.S. Virgin Islands | * |
| * Data Withheld to maintain confidentiality. NA – Not Available. | |

Appendix III

Internet access service providers with 100 percent of the students they serve meeting the minimum 100 kbps per student needed for digital learning

| Service provider | # of students served | % Total students served meeting goals |
|----------------------|----------------------|---------------------------------------|
| Conway Corporation | 9,733 | 100% ★ Connectivity leader |
| Nexus Systems, Inc. | 7,462 | 100% ★ Connectivity leader |
| SkyRider Comm | 5,424 | 100% ★ Connectivity leader |
| Conterra, LLC | 4,516 | 100% ★ Connectivity leader |
| Vantage Telecom, LLC | 3,278 | 100% ★ Connectivity leader |
| Madison County | 3,154 | 100% ★ Connectivity leader |
| Yelcot Tele Co | 1,685 | 100% ★ Connectivity leader |
| Walnut Hill | 1,642 | 100% ★ Connectivity leader |
| Telecomp Comp Serv | 1,297 | 100% ★ Connectivity leader |
| Pine Bluff | 1,296 | 100% ★ Connectivity leader |
| ENA Services, LLC | 1,038 | 100% ★ Connectivity leader |
| Telecomm Mgmt | 897 | 100% ★ Connectivity leader |
| Lavaca Telephone | 849 | 100% ★ Connectivity leader |
| Verizon | 589 | 100% ★ Connectivity leader |
| Resort TV | 589 | 100% ★ Connectivity leader |
| Hope Community | 581 | 100% ★ Connectivity leader |

Snapshot of K-12 Connectivity in Arkansas



About the Metrics

K-12 Broadband State of the States Report

The State of the States report is based on data from the publicly-available K-12 school district E-rate filings collected by the Federal Communications Commission and administered by the Universal Service Administrative Company. EducationSuperHighway verified and analyzed completed 2016 E-rate applications and conducted extensive nationwide outreach to verify school districts' network infrastructure. The data represents K-12 public schools only and does not include private schools, independent charter schools, or libraries.



CONNECTIVITY

This metric shows the percent of school districts meeting the FCC minimum connectivity goal of 100 kbps per student. The number of students with the minimum connectivity is an extrapolation of the percent of students in the sample that are meeting goals to the entire population of students in the state. Student populations are based on 2013-14 NCES data.



UPGRADES

This metric shows the number of students in school districts that upgraded their Internet access bandwidth from 2015 to 2016. Only districts with verified data in both 2015 and 2016 are included in the upgrade metric. As a result, this metric may slightly underestimate the total number of school districts and students that upgraded. We define "upgrades" as an increase in bandwidth from 2015 to 2016 of at least 11% or at least 50 Mbps.



FIBER

This metric reports on the availability of scalable infrastructure. The FCC goal is for every school to have a broadband connection capable of scaling to 10 Gbps and today only fiber optic connections are capable of meeting that goal. For schools where the connection type was unknown, we applied assumptions based on extensive research. Some states may see decreases in their fiber metric from 2015 due to a reclassification of cable and fixed wireless connections from scalable to unscalable.



WI-FI

The FCC provided every school district with a \$150 per student total "Category 2" budget from 2015-2019 to upgrade Wi-Fi and other internal connections in classrooms. Our metrics profile the state of Wi-Fi connectivity in schools as reported by E-rate applicants and the extent to which districts have taken advantage of their Category 2 budgets.

- **Wi-Fi sufficiency:** The percentage of sufficient school districts is determined by dividing the total number of school districts that reported "Completely" or "Mostly" sufficient (as opposed to "Sometimes" or "Never") by the total number of districts that reported on the sufficiency of their Wi-Fi.
- **E-rate funds available:** We calculated the total Category 2 budget remaining for 2017-19 after subtracting funds requested in 2015 and 2016. We applied school district discount rates when available, otherwise we applied the aggregate state discount rate of school districts requesting Category 2 services.



AFFORDABILITY

Affordability of broadband is a roadblock that prevents school districts from meeting the FCC minimum connectivity goal, therefore we calculated the percent of school districts that could be getting more Internet access bandwidth for the amount they are currently spending.

- **Maximizing the bandwidth:** We compared the amount of bandwidth districts currently receive to the amount they could purchase if they used their current Internet access budget to buy circuits at 2015 benchmark prices (benchmarks were selected because at least 30% of school districts nationally are currently purchasing circuits at those prices). A school district's Internet access budget is the total cost of all Internet access services, including ISP costs and the cost of transport between the school district and the ISP. Shared costs for backbone circuits and ISP-only services were distributed based on the number of students enrolled in the school district. Note: This metric was re-calculated for 2015 using this methodology, and therefore is different from what was reported in the 2015 State of the States.

| Internet Access Circuit Size | Price Benchmark (\$/Mbps) |
|------------------------------|---------------------------|
| 10 Gbps | \$0.75 |
| 1 Gbps | \$3.00 |
| 500 Mbps | \$5.50 |
| 200 Mbps | \$9.00 |
| 100 Mbps | \$12.00 |
| 50 Mbps | \$14.00 |

Project Concept and Buildings with State Entities Impacted

The Department of Information Systems (DIS) seeks to obtain dark fiber transport that will be configured in a ring and star topologies consisting of two (2) dark fiber network rings and fourteen (14) point to point dark fiber connections back to the state's primary data center (SDC-MAC) or the state's backup data center (SDC-West). Each connection will require one *pair* of fiber (two fiber strands) with the option for additional *pairs* as needed by the state. For rings 1 and 2 the vendor is asked to provide the cost for optional diverse routing of the fiber *pairs* between the two point sections of each ring.

Ring 1 (Table 1) is planned to connect all of the state agencies listed below:

- The State Primary Data Center – MAC (SDC-M)
- The State Backup Data Center - West (SDC-W)
- The State Ledbetter Building (LED) Data Center

Ring 2 (Table 2) is planned to connect all of the State agencies listed below:

- The State Primary Data Center (SDC-M)
- The State Backup Data Center - West (SDC-W)
- Donaghey Plaza North (Waldon Building) is located at: 108 East 7th St., Little Rock, AR 72201
- Mann on Main is located at: 324 South Main St., Little Rock, AR 72201
- Arkansas Department of Health (ADH) is located at: 4815 West Markham St., Little Rock, AR 72205
- Arkansas State Police (ASP) is located at: 1 State Police Plaza Dr., Little Rock, AR 72209

The following locations will connect to either the state's primary data center (SDC-M) or to the state's backup data center - west (SDC-W) via point to point connections in the most effective topology.

- Union Plaza 1 Building is located at: 124 West Capitol Av., Little Rock, AR 72201
- Department of Arkansas Heritage (DAH) is located at: 1100 North St., Little Rock, AR 72201
- City of Little Rock is located at: 718 West Markham St., Little Rock, AR 72201
- 5 Main Place is located at: 413 South Main St., Little Rock, AR 72201
- 1515 Building is located at: 1515 West 7th St Little Rock, AR 72201
- Arkansas Teacher Retirement is located at: 1400 W 3rd St. #200, Little Rock, AR 72201

- Arkansas Public Service Commission (PSC) is located at: 1000 Center St., Little Rock, AR 72201
- Arkansas Workers Compensation Commission (AWCC) is located at: 324 South Spring St., Little Rock, AR 72201
- Arkansas State Hospital (ASH) is located at: 305 South Palm St., Little Rock, AR 72205
- Little Rock School District (LRSD) Technical Center is located at: 7701 Scott Hamilton, Little Rock, AR 72209
- Arkansas State Highway and Transportation Department (AHTD) is located at: 10324 Interstate 30, Little Rock, AR 72209
- Arkansas Game and Fish Commission (AGFC) is located at: 2 National Resources Dr., Little Rock, AR 72205
- Arkansas State Crime Lab is located at: 3 Natural Resources Dr., Little Rock, AR 72205
- Arkansas Department of Environmental Quality (ADEQ) is located at: 5301 Northshore Dr. North Little Rock, AR 72118
- Arkansas National Guard (ANG) is located at: @Building 6200 Camp Robinson, North Little Rock, AR 72118
- AREON North Little Rock Hut is located at 2809 Eanes Road, North Little Rock, AR 72117