

# **Technical Whitepaper**

## **Arkansas Broadband Data Submitted for April 1, 2011 to NTIA**

### **Submitted By Connect Arkansas**

#### ***Connect Arkansas***

Connect Arkansas, a private, non-profit, is implementing a community-based initiative to promote internet access and education. The Connect Arkansas Broadband Act was signed into law by Governor Beebe on March 28, 2007, to ensure the creation of a competitive broadband, or high speed internet, infrastructure that will not only improve personal lives, but also the economic capabilities and of all Arkansans.

To facilitate statewide broadband access, Connect Arkansas, a "delivery platform neutral" entity focuses on three major components: Determination of existing broadband infrastructure in Arkansas, Education, and Accessibility to computer devices. The first of these components, determining existing infrastructure, facilitates the requirements of the SBDD Program adequately.

#### ***Identification of Broadband Providers***

As of March 1st, 2011, Connect Arkansas has identified by DBA name Seventy-eight (78) Broadband Providers in the state of Arkansas. These providers are identified as having infrastructure in the state and are not identified as being resellers. Of these providers, Seventy-two (72) submitted to Connect Arkansas at least partial data to map coverage. Of the remaining six (6) Broadband Providers, three (3) have agreed to provide data in the future. From the Fall 2010 list two (2) providers are either no longer in business (Vista Vox) or planning to discontinue providing Broadband in the near future (IOCC).

#### ***Data Collection and Processing***

For the Spring 2011 data set all providers were contacted first via mail, then email, and finally with telephone calls to the point of contact for each company. Sixteen (16) companies updated coverage information as far as speed or coverage area. The other fifty-six (56) participating Broadband providers chose to display data as unchanged from the Fall 2010 NTIA Data Submission.

The format of data collected has been in various formats as listed below:

- ArcGIS Shape files
- Tab delimited files of Address Ranges
- Tab delimited files of Addresses
- Physical maps of coverage
- Tower information for propagation

Shape files were easily formatted to conform with standards in the SBDD Data Model.

All tab delimited address files were geocoded using the ESRI geocoding engine in ArcGIS. These geocoding passes were used against the standard ESRI database, as well as U.S. Census Tigerline data, and Arkansas Geographic Information Office's Street Centerline and Address Points. In the

rural areas of Arkansas the accuracy of geocoding is much lower than in urban areas. To help remedy this, Connect Arkansas reviewed the geocoding results with each provider, giving each the opportunity to correct any issues. Note: any geocoding results that fell outside of a providers existing telephone exchange or know service areas were discarded. From these results, nearest road centerlines or census blocks (less than 2 square miles) containing the geocoded points, were selected to represent the Broadband Providers Coverage. Note: only two (2) Broadband Providers provided data at the address level.

Any physical maps of coverage (including those submitted in pdf format) were used as a basis to manually select line segments from existing road centerlines in the state (based on U.S. Census Tigerline data). From these results census blocks (less than 2 square miles) that contained the digitized road centerlines were selected along with the road centerlines in areas of larger census blocks, to represent the Broadband Providers Coverage.

Fixed Wireless tower information (including Latitude, Longitude, Frequency, Power, Height) were gather and entered in to EDX Signal software to model signal propagation. This software also took into consideration terrain elevation as well as ground clutter to accurately model the Broadband signal, in most cases to a twenty (20) meter degree of accuracy. These raw propagation models were processed in ArcGIS into more organically smooth shapes to conform with standards in the SBDD Data Model.

The results of the processes above were loaded into the SBDD Data Model and the latest CheckSubmission script was run. All resulting failed processes were analyzed and addressed to result in No Fails in Census Blocks, Road Segments, or Wireless Coverage data sets.

Middle Mile information that was received (most Broadband Providers view Middle Mile as proprietary information and elected not to submit) as tab delimited text files or as a spread sheet in Microsoft Excel. This information was brought into ArcGIS, processed, then formatted to conform with standards in the SBDD Data Model and uploaded.

Community Anchor Institution data is information received from 3rd party sources in regards to institutions as outlined in the NOFA. Most of the data collected is from phone surveys to each location. In some cases difficulties were presented in finding a suitable technical point of contact to collect information. Arkansas Department of Information Systems has agreed to help provide information for public schools as well as HITArkansas for Health Systems, in future submissions. Only Community Anchor Institutions that could be geolocated were included. Connect Arkansas has also decided with this submission to include commercial locations with publically available broadband (typically via WiFi).

### ***Verification Processes***

Connect is currently using several methods to verify data collected. The format of data collected has been in various formats as listed below:

- Telephone surveys
- FCC released Form 477 data
- Telephone Exchange Boundaries
- Data collected from feedback on [maps.connect-arkansas.org](http://maps.connect-arkansas.org)
- Data collected from speed tests on [www.connect-arkansas.org](http://www.connect-arkansas.org)
- Speed test data released from Broadband.gov

***General Notes***

The majority of Broadband Providers Submitted Maximum Advertised Speeds at the MSA/RSA level, or overall coverage areas which in some cases represent a large portion of land, in some cases several counties. At the direction of Andrew MacRae with NTIA, Connect Arkansas has pushed these speeds down to the census block and road segment level. Some inaccuracies can be seen in the data as actual Maximum Advertised Speeds in some cases vary from zipcode to zipcode in some cases.

All Census Block data is 2000 vintage, and all Road Segments are based on Tigerline 2009.

Connect continues to identify small providers, in particular fixed wireless providers that do not advertise or have a web presence. It is possible that several more of these providers will be identified in future data submissions.

It should be noted that in some cases relating to Cable Companies in Arkansas several of these described their Broadband Coverage area as "all streets within XX city limits".