State of Arizona

Arizona Broadband Assessment Project (AZ BAP)

Methodology White Paper

Submission 8 - October 1, 2013

for Fall 2013 (V2)

State of Arizona

Arizona Strategic Enterprise Technology Office (ASET)

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Arizona Broadband Assessment Project Overview

The purpose of the Arizona Broadband Assessment Project (AZ BAP) is to identify both the availability and speed of broadband services, the location of broadband infrastructure throughout Arizona including middle mile infrastructure, and the presence and characteristics of Community Anchor Institutions (CAIs). This project is provided through the American Recovery and Reinvestment Act of 2009 (ARRA) and the Broadband Data Improvement Act (BDIA), and in conjunction with the National Telecommunications and Information Administration (NTIA) and the Federal Communications Commission (FCC). AZ BAP is managed by the Arizona Strategic Enterprise Technology Office (ASET) under the Arizona Department of Administration (ADOA), in partnership with the Arizona State Land Department (ASLD), contractor Data Site Consortium, Inc. (DSCI) and their GIS subcontractor, TerraSystems Southwest (TSSW).

Submission 8 for Arizona broadband availability and the associated CAI data set was duly submitted to NTIA prior to the October 1, 2013 deadline. Fall 2013 was the eighth of the ten scheduled semi-annual submissions by the State of Arizona and serves to capture and reflect broadband availability and conditions in the field as of June 30, 2013. See the complementary AZ BAP Broadband Coverage Report for Fall 2013 for details and maps of Arizona broadband coverage and data in this submittal.

There are several **Digital Arizona Program (DAP)** initiatives at the state level. The **Digital Arizona Council (DAC)** with their web presence at http://www.digitalarizona.gov/Digital_Arizona_Council/About_DAC.html meets quarterly and is working on an Arizona Broadband Strategic Plan draft. The **Arizona Broadband Map** portal (http://www.digitalarizona.gov/Maps/Arizona_Broadband_Maps.html) offer interactive insight to broadband coverage across the state and the community planning version integrates substantial demographic and economic data to aid policy analysis and planning. DAP has recently launched an **Arizona Broadband Speed Test** available for resident and enterprise use at http://www.digitalarizona.gov/Survey/AffiliationQuestion.html for gathering information about broadband coverage and performance across the State. They are strongly encouraging broadband stakeholders to take the speed test periodically and to also distribute the information and request to utilize among their respective stakeholder communities.

Broadband Provider Participation

Broadband Providers Identification Strategy

The process of identifying Broadband Providers (BPs) in this cycle consisted of verifying that BPs participating in the previous cycle are still relevant and under the same ownership, as well as identifying previously unknown BPs through referrals, research, and analysis of speed test results. The whole nature of the Arizona Broadband Assessment Project (AZ BAP) revolves around data collection from relevant BPs, thus the comprehensive identification of relevant BPs active in the Arizona market and definition and determination of relevancy are the key steps in maintaining an up to date universe of target BPs for subsequent engagement. Additionally, since the market is dynamic, as BPs go out of business, merge, startup or otherwise transition, an ongoing strategy and actions for adding to and updating the relevant BP universe is required. We maintain a not-in-play list to assist in properly classifying BPs over time and codifying our research, interactions, and findings.

Broadband Providers Engagement Strategy

The initial E-Mail Communications Package was developed as a collaborative effort among Data Site Consortium Inc. (DSCI), Arizona Strategic Enterprise Technology Office (ASET), and Arizona State Land Department (ASLD). It included an introductory cover letter under the signature of the ASET Director (State of Arizona CIO), followed by a more detailed and specific letter from DSCI, a copy of the standard project NDA, and an Arizona Broadband Provider Technical Appendix. The two letters give the project explanation, value proposition, and call to action with the NDA and Technical Appendix yielding expanded and supporting documentation.

In subsequent data collection cycles, DSCI has developed a series of standard cover letters that are adapted as needed (perhaps based on elements from previous conversations or presentation of anomalous findings) to comprise the body of the personalized letter and cover e-mail for transmittal at the beginning of the "data ask" cycle. DSCI fields any BP responses by e-mail, letter, phone, or in-person, answering any questions from the provider and moving towards their fresh data submittal.

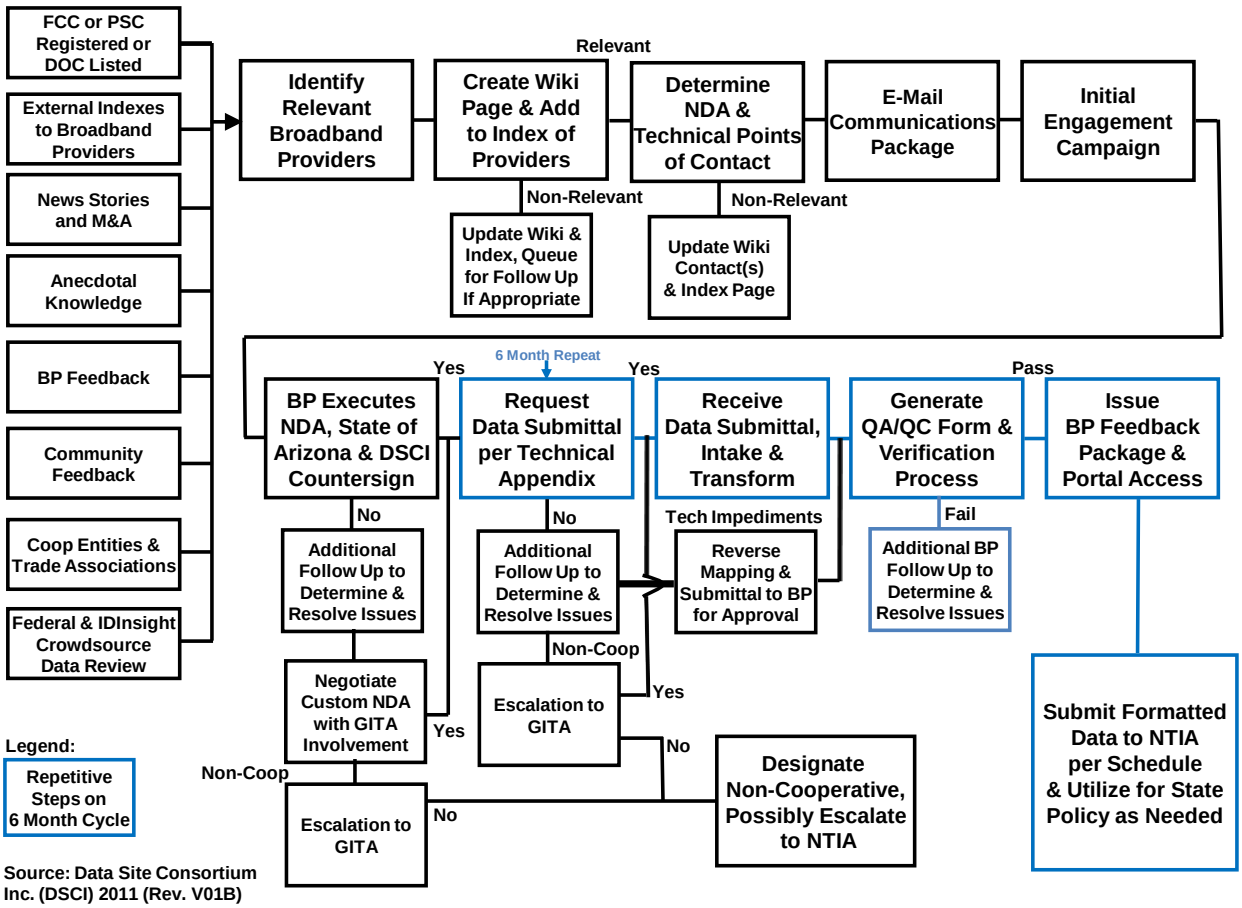
A Data Ask Letter goes to the majority of participating BPs who have submitted data in past cycles. A variant, the BP Reverse Mapping Letter goes to another dozen or so participating BPs whom we reverse map and then work with to verify. Another variant, the BP Cooperation Letter only goes to newly identified BPs whom we are seeking to engage and get under NDA. The Technical Appendix is included as part of the package to all BPs.

Some of the salient points covered in this cycle in the communication package to the BPs include the following:

- Every cycle our team holds extensive collaborative review sessions in a GIS environment to evaluate and verify a BP's data. We have found including BP representatives in these sessions to visually and interactively review their data submittal with us proves beneficial to all. It allows corrections and adjustments to be made in real-time and helps assure the high data quality. We seek to schedule such a session with BPs interested in reviewing their data or when needed to help resolve questions and noted anomalies.
- As broadband technologies and deployments continue to evolve, the NTIA has expanded and/or shifted the acceptable speeds for some technology types. We request that BPs refer to the current Technical Appendix and its speed vs. technology type chart especially and specifically note if they're now delivering higher broadband speeds than previously.
- Some Broadband Providers have submitted incremental information in the past. We ask that BPs submit a complete current estimate of their Arizona broadband coverage each cycle. Complete coverage submittals are easier to process and less error prone.
- Additionally, the State would like to collect information as to the actual customer addresses passed (addresses that BPs can provide service to in under 7 days) or customer addresses served by them. This would allow for more detailed analysis to inform policy directions, but is not provided by most BPs.

After a BP's data has been transformed and put through the verification process, a BP Feedback Letter is prepared and sent noting any issues or anomalies accompanied by a series of map visualizations and an invitation to follow up with any questions, corrections or concerns.

Below is a diagram that illustrates the overall Provider Engagement Process.



Non-Disclosure Agreements (NDA)

NDA Overview

Because initial NDAs between the State of Arizona and our providers had a two-year term, we needed to generate new NDAs with our providers for Years 3-5 of the program. We continued this activity and have renewed NDAs with most of our providers and received buy off as to not requiring an NDA from the rest. While some BPs opted out of the NDA process, the majority chose to participate, by negotiating and signing a new NDA. The providers that chose to opt-out fall into two groupings. A first group consists of providers that were not sufficiently concerned with possible misuse of their data to be motivated to execute a NDA. All providers within this group provided data as required for the submittals to date. A second group consisted of providers that chose to largely boycott the mapping process. Members of the second group generally have not provided data. However, we have been successful in interfacing with the majority of these providers via our reverse mapping processes wherein we obtain relevant data from third party sources and present the data to each provider for discussion and corrections before incorporating it into the biannual data submittal.

NDA Considerations and Related Rationale

Within the context of the Program, we have deployed a NDA when sharing confidential information between or among trusted parties. The NDA utilized comprises an agreement wherein the provider, the discloser of the information, achieves specified safeguards and the receiver of the information is allowed specific uses of the information for a specified period.

Generally, we have included both the safeguards and the specific uses, and have framed these constructs within a consistent set of duties and obligations to which the parties mutually agree. Important Program NDA framing issues include:

1. **Definition of the parties and their respective objectives (generally whereas statements)**. Generally the Program NDAs are construed between a disclosing party (generally a Broadband Provider) and a recipient party (generally the State), wherein the disclosing party may be an owner of the confidential information or merely may have a present right-of-use of the information.
2. **Definition of the confidential information**. Generally, the parties negotiate what information is confidential. This negotiation generally strikes a reasonable compromise between the information discloser wants for broad inclusive language and the recipient's desired narrow and specific language. Often such definitions are constructed so as to include both general categories of information followed by specific instances within those categories.
3. **Exceptions to confidential information**. Exceptions described both as general categories and specific instances are equally important to adequately characterizing the confidential information.
4. **Ownership of the confidential information**. Often the confidential information provided by a disclosing party will not be owned by that party, but is rightfully possessed under an existing license or similar right-of-use of the information. Thus, such limitations must also be described, appropriate indemnities devised, and notice provided to the underlying property owner associated with the confidential information.
5. **Definition of obligations of confidentiality**. Obligations of confidentiality focus to acceptable use and unacceptable misuse of the information provided by the recipient. Such obligations often also cover secondary disclosures by agents of the recipient with appropriate need-to-know requirements and recordkeeping.
6. **Exceptions to the obligations of confidentiality**. Confidential information by its nature must be confidential to someone or in some respect. Once such information loses its confidential nature, it generally becomes freely available to all comers. Because information that is initially thought to be confidential may not be so, the NDAs delineate such exceptions. Thus, the NDAs list specific means under which disclosed information is not deemed confidential, such as the disclosed information becoming publicly known by acts of others or discovered by the recipient by other means.
7. **Definition of what constitutes breach of the agreement**. Gravamen of breach of NDAs centers on intentional and unintentional disclosure of the information within the established term of the agreement. Related considerations include materiality of a disclosure and whether it is volitional. The NDAs identify the types of breach in detail. As with the definition of confidential information, the NDAs also specify instances that do not constitute breach.
8. **Agreement of available remedies for each type of breach**. Generally, all breaches require that the breaching party immediately notices the disclosing party of such breach. Such notice should occur in sufficient time that the disclosing party can intervene for protecting its rights to the confidential information where possible. Further, it is appropriate that the recipient agree that certain breaches equate to irreparable harm to the disclosing party, giving the disclosing party injunctive rights. Money damages may

also be appropriate or the immediate return of all confidential information to the disclosing party. The NDAs generally minimize language relating to money damages.

9. **Term of the agreement**. A NDA term generally entails defining a period required for the parties to effectively disclose and utilize the information here initially a 2-year term, followed by a 3-year term. At the end of the term, and potential extensions, generally the recipient must either return or destroy all confidential data and provide an affidavit to the disclosing party that it returned or destroyed the information. Typically, the NDAs also include a second, longer term during which the parties will agree to maintain confidentiality of the information
10. **Miscellaneous issues**. These issues include agreed to law, integration, assignment rights, notice addresses, dispute resolution means, and the like by the parties.

Data Collection and Integration

Primary Data Collection

Overview

DSCI solicits and receives the BP broadband data submittals, doing intake processing and usability crosschecks. DSCI's GIS subcontractor TerraSystems Southwest (TSSW) corrects any format issues, transforms the data to prepare it for federal submittal, documents the technical steps performed during that preparation for quality assurance and BP feedback, leads the team in collaborative data verification sessions, as well as supports further State use of the data in mapping and policy processes.

Reverse Mapping Role & Processes

The use of reverse mapping was key to depicting broadband coverage for: Broadband Providers unable to supply coverage area information; Broadband Providers with incomplete coverage area information; and Non-responsive Broadband Providers. Regardless of the scenario, DSCI and TSSW employed a number of logical methods to derive "where and which" broadband services a Broadband Provider likely had available. Some of the key elements used to initiate reverse mapping included:

- FCC Form 477 data, though dissolving census blocks greater than 2 square miles into applicable road segments required special techniques and attention
- Central Office (CO)/Digital Subscriber Line Access Multiplexer (DSLAM) location (wireline) - used in conjunction with distance buffers to best determine "where" outside plant infrastructure would reside. We used multiple public information sources to discover CO and DSLAM locations.
- Tower location (wireless) - used propagation models to determine "coverage/reach" based on services provided (frequencies, lat/long, terrain). We used an "E-coverage" tool from Wireless Applications Corp as well as "Radio Mobile's" radio frequency coverage tools.
- Service Book/Offerings - usually determined through publicly available information (technology of transmission, speeds, etc.).
- Tribal boundary information (From FCC) - GIS shapefile used to determine Tribal boundaries and census blocks/road segments contained therein.
- Public Information Sources - from various sources including BPs' own websites to provide a "picture" of their network, services, and coverage.

Such reverse map estimations of the BP's coverage and technology are then presented back to the BP for confirmation or feedback leading to iterative adjustments, sometimes via collaborative online viewing sessions, and resulting in a "best guess" for their current delivery footprint. BPs without current GIS capabilities were frequently impressed with our techniques and interested in using the reverse mapping outputs internally and externally.

Data Intake and Validation Application (DIVA)

DIVA Overview

The Data Intake and Validation Application (DIVA) was developed by TerraSystems Southwest (TSSW) as a subcontractor to DSCI under contract with ASET in support of the Arizona Broadband Assessment Project (AZ BAP). DIVA is a Windows desktop application designed to transform raw Broadband Provider data about the location, technology and speed of broadband services into a form that can be cleanly linked to GIS layers and imported into the NTIA standard national broadband mapping program geodatabase.

A key goal of the DIVA design was to reduce data processing time while increasing data integrity. A secondary goal was to create a freely distributable software tool that Providers and other State broadband organizations could apply to their data intake and validation tasks. Alternative approaches, such as integrating with ArcGIS or data translation software like FME were not pursued as that would mean users would have to purchase those products at a significant expense while DIVA was specifically designed and tuned for the task at hand.

DIVA does not perform any spatial validation or processing. DIVA was scoped as "pre-GIS" software, designed only to speed and improve the processing of Provider data to a point where it could be more cleanly geocoded or linked to NTIA GIS layers. Based on this design criteria, DIVA is not very useful for wireless service shapefile deliveries where the feature counts (data Records) are a couple of hundred, or less, and are in more or less proper SBDD format. However, it really shines in processing address, census block, and road segment submittals of tens or hundreds of thousands of records, and where Providers have not followed the SBDD coding scheme.

DIVA Capabilities

DIVA offers a rich user interface for exploring and processing Provider broadband data into a form that can more easily be linked to NTIA-required GIS feature classes. Some of its key features are listed below.

- Configurability - DIVA offers many opportunities for configuration. New Provider identification information can be imported and applied to every Provider submittal. New releases of the SBDD geodatabase are read and up-to-date Rules are automatically created and applied. Processes and Rules in DIVA are very general and may be user-configured to achieve various results.
- Consistency - a very structured approach to data processing is embedded in the design of DIVA. This begins with the clear definition of data elements and their relationship to one another in an Object Data Model. Consistency is also inherent in the clear definition of Processes and Rules that can be applied to the data and in the way that Processes and Rules are used to transform and validate the output data. In the rush of meeting data-delivery deadlines it is easy to forget or misapply data processing steps. By automating much of the required processing, DIVA increases the amount of time that a

user has to actually review and check data, and makes it easier for the user to achieve consistent results in the exported data sets.

- Re-usability - Users can define a set of Processes within a particular Reporting Period as a Template and then apply the Template to new Input Files. Rules are uniformly applied to Providers for each Reporting Period. This includes user-defined rules: once defined and applied, they will automatically be applied to subsequent Submittals.
- Processing Documentation - metadata (e.g. notes) regarding Providers, Submittals, Input Files and other elements may be added at any time using the “Edit Metadata” button on the Status Bar. Notes can be viewed or exported at any time for cutting and pasting into NTIA documentation. These notes, plus the actual Input File(s) associated with a Submittal, the assigned Processes, Rule violations and final output, constitute DIVA’s Metadata system. A good example of metadata stored in a Process is the translation table from Provider actual speed values to NTIA speed tier codes: the value mapping is preserved and can be reviewed in DIVA by opening up the applicable Submittal and generating a detailed Input File report or by right-clicking on the Translation Process in the Processes tab.

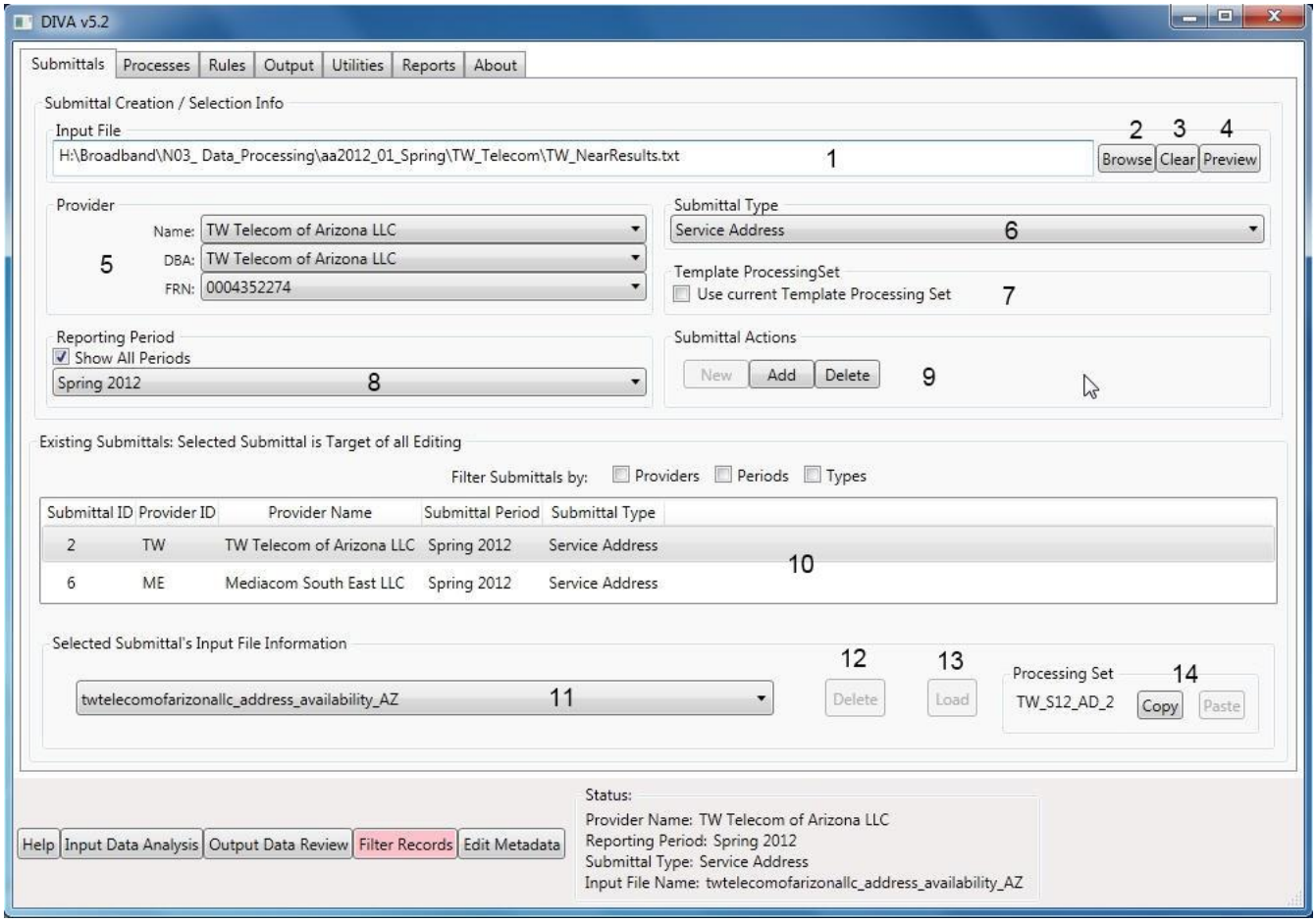
DIVA Impact

The efficiencies resulting from the application of DIVA to Provider data are substantial. In the first submittal period in Spring 2010, a number of larger providers would consume 24-40 hours of processing time to evaluate, transform, quality check and export to SBDD database format. Processing a similar set of data in the latest submittal period (Fall 2013) using DIVA is a 2-4 hour process for even the most complex BP data submittals.

A substantial portion of this improvement is the result of (a) knowing the data and what to expect from a given Provider and (b) improved manual processing, especially on the GIS side. However, another substantial portion of the improvement has come from the integrated data evaluation, checking, transformation, and validation and export capabilities of DIVA itself. We estimate that DIVA can reduce processing time in half for large address or census block submittals from the Providers. This efficiency is gained from having all the evaluation, transformation and validation tools available in a single interface instead of applying a variety of application software packages in varying order to each Provider file in each Reporting Period.

DIVA was designed and implemented to be quite portable and readily usable by other grantees. North Carolina has requested detailed technical information on DIVA and the NTIA and other grantees have expressed interest. Arizona is glad to share all relevant information and source code, including a comprehensive user manual as well as guidance in implementing the application to other grantees at no cost. The only real caveat is that we can offer only quite limited tech support without specific coverage of costs for time spent.

Below is an image of the control panel for the submittals tab, which contains all the controls a user needs to manage the intake of provider data.



Arizona Road Network Evolution

Since the Spring 2013 delivery the DSCI team has been improving our road network submittal through the integration of locally-generated road networks in addition to the TIGER and Navteq products we have been using exclusively on prior submittals. The local road networks are provided to us by 12 of the 15 Arizona counties. The three non-participating counties are in the process of building their road networks and we should be using all 15 counties for the Spring 2014 submittal. We geocode each Provider's address submittal against a composite address locator. This locator attempts to geocode and address first against our local network, the TIGER 2009 and 201o files and finally Navteq. Roads to which addresses geocode are pulled into the NTIA submittal. With four sources, the workflow can become complex and time-consuming. With the completion of the local network across the 15 counties this coming Spring, we will use that network exclusively, thereby saving time and producing a more consistent road network submittal.

Community Anchor Institutions (CAI)

Data for the Community Anchor Institutions (CAIs) resides in many different locations throughout Arizona and were collected from data custodians and/or data integrators throughout the State. This effort has two major components, the identification and geo-location of the CAI entities and the collection of data related to the status of their broadband usage. Both of these components have significant challenges for development and maintenance. The State does not currently have any centralized databases that could serve as a core basic backbone for CAI data development. Thus a sizeable data collection and standardization effort has been undertaken and matured over time. The Arizona Broadband Assessment Project (AZ BAP) provides impetus for one of the first State efforts to consolidate CAI data into one database.

A considerable effort in basic data development working with local government websites and one to one contacts has been required to address some basic aspects of the CAI data collection. Numerous organizations in Arizona maintain locational information regarding some categories of CAI data but these are all of varying formats and currency. In many cases the project has had to assist CAI location data custodians in the update of some aspects of the basic locational data. The Project also is, in most cases, the first time that CAI managers have developed information regarding the level of broadband services for their institutions. This poses a host of challenges regarding a large number of existing processes in many organizations.

Past submittal cycles had not properly included CAIID values generated from federal school and library identification codes, but has completely remediated that issue in this cycle. A significant number of CAI records were not usable from past submittal cycles due to non-compliant addresses, particularly those with post office boxes, intersections, and rural mailboxes along highways. These non-compliant addresses were largely remediated during this cycle, though some work remains for a small residual group. Further focus was given to improving the inclusion and having correct naming of school and library entities, as well as the addition of some limited incremental broadband information, especially for libraries from the mining of e-rate applications that USAC had granted. ASET and DSCI have added a number of additional CAI record elements the master spreadsheets associated with different categories of CAIs to inform and assist other broadband related processes and policy initiatives.

For the Spring 2014 submittal cycle, the DSCI team will focus on further reductions in non-compliant addresses, substantial improvements in K-12 broadband information, augmentation of public safety CAI information, and the addition of substantial numbers of additional non-governmental CAIs such as those providing public Wi-Fi access.

CAIID Calculation Guidelines per CAICAT Type

The following represents our current understanding of calculating correct CAIID values for each of the seven CAICAT types and served as a guide for processing our Fall 2013 submittal. Specific spreadsheet Column references below (unless otherwise noted) are to Arizona's internal CAI spreadsheet as provided by DSC to ASLD and may change after this submittal is processed.

CAICAT= 1 (School - K through 12):

Use the NCES 12-digit school IDs or 7-digit district IDs that appears in Column Y NCES_School_ID directly for CAIID as is. The first two digits are a state code for Arizona = 04. These values can be found at http://nces.ed.gov/ccd/bat/.

Where a school has no NCES code, the default CAIID value is "-9999" indicating that it is unknown or not provided.

CAICAT= 2 (Library):

Use the 6-character FSCSKEY that appears in Column CT followed by a hyphen followed by the 3-character FSCSSEQ that appears in Column CU when available. When combined they make a 10-character-long LIBID that is to be placed in the CAIID field for this CAICAT type. Example: AZ0271-002.

FSCSKEY contains 6 characters (state abbreviation for Arizona AZ plus 4 digits) and uniquely identifies a public library (or public library system). FSCSEQ contains 3 characters (digits) and uniquely identifies a particular outlet (or branch) within that public library. These values can be found at http://www.imls.gov/research/public_libraries_in_the_united_states_survey.aspx.

For any identified libraries without a match in the IMLS data for Arizona, use "ZZZZ" for CAIID indicating that it is unknown or not provided.

CAICAT= 5 (University, college, other post-secondary):

Use the 6-digit IPEDS ID directly for CAICAT=5 CAIID which can be found at http://nces.ed.gov/ipeds/datacenter/. See the "NCES AZ Higher Ed School Data (142) 08_28_13" spreadsheet pulled down by AZ BAP where Column A is labeled UnitID and whose value is contained in the Arizona internal CAI spreadsheet under Column Y NCES_School_ID.

The obtained federal ID is utilized as is without the addition of a prefix indicating the state, "AZ" or "04".

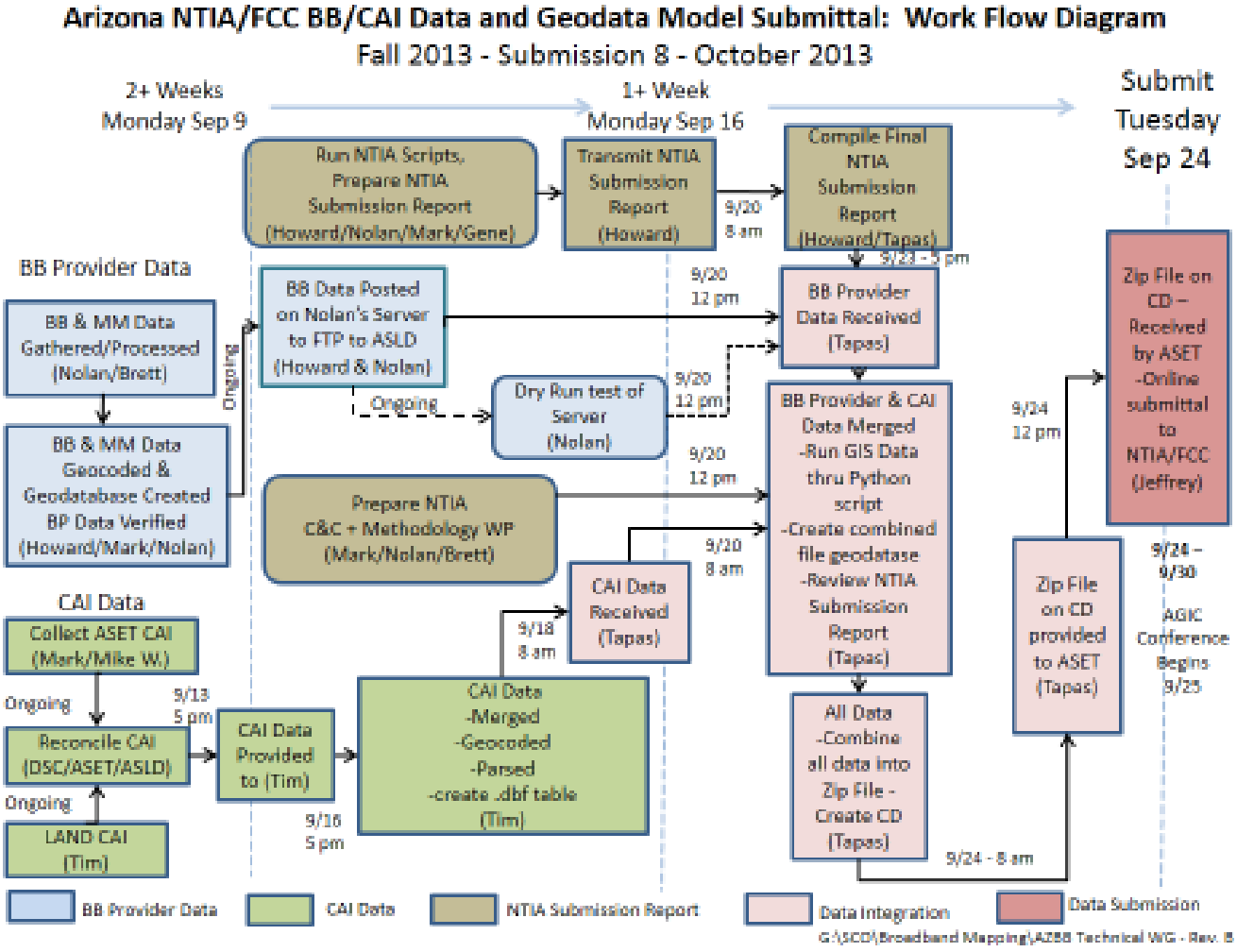
Where a higher education institution has no available NCES code, the default CAIID value is "-9999" indicating that it is unknown or not provided.

CAICAT= 3 (Medical/healthcare), 4 (Public safety), 6 (Other community support - government), 7 (Other community support - nongovernmental):

NTIA has no specific suggestions for the generation of CAIID for the other four CAICAT types. Arizona will create an 8-digit ID comprised of the state code = AZ followed by 6 digits going from 000001 to 999999, derived from the unique Arizona Key_ID assigned to each CAI entity, adding leading zeros following the AZ abbreviation as needed.

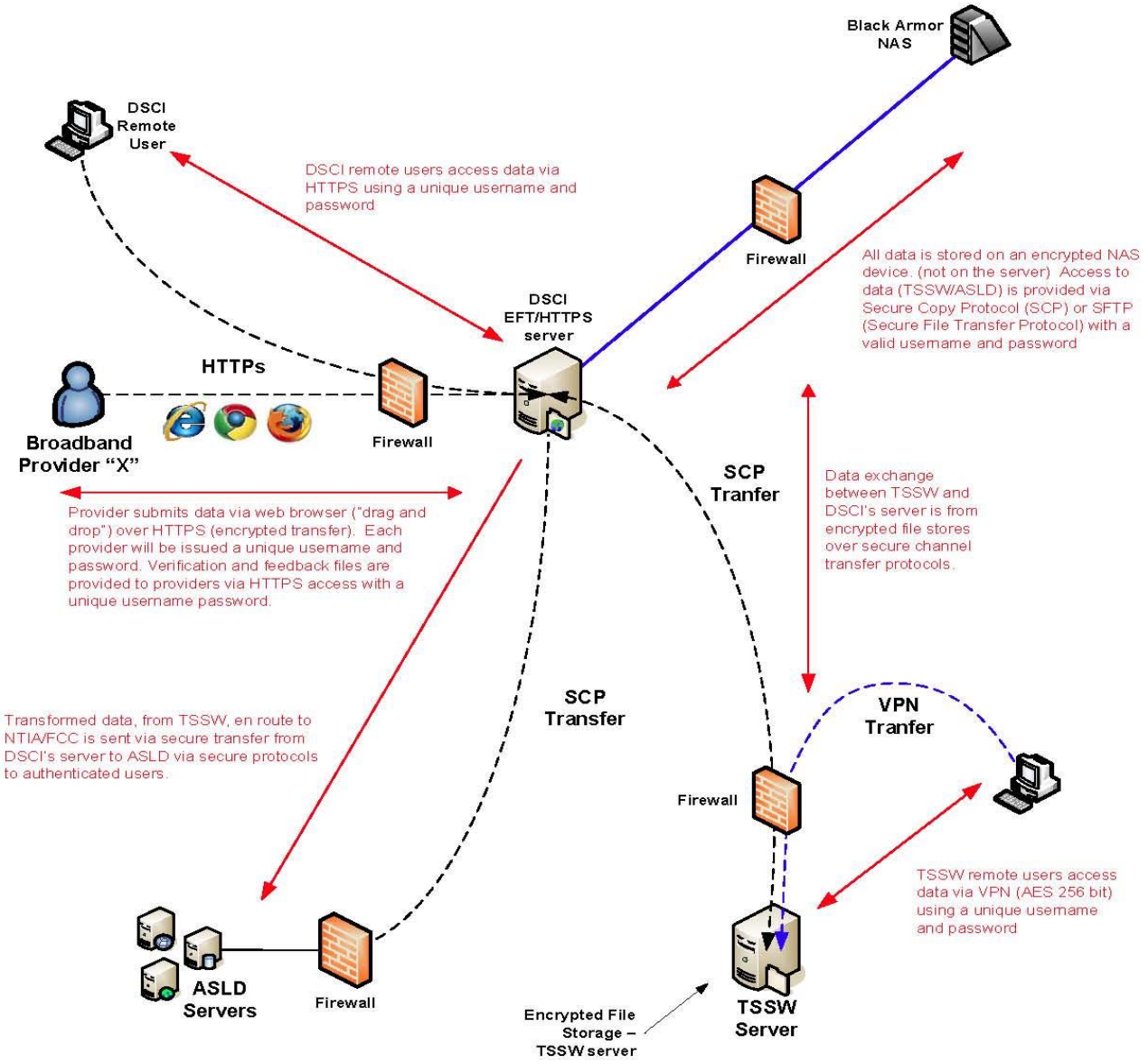
Project Data Flow and Security

In order to provide a timely submittal ASLD maintains a workflow and dataflow process depicted in the diagram below with designated responsible parties to establish timelines for the completion of significant tasks. This process is updated and modified as needed for each submittal.



DSCI provides a secure web browser-based portal supporting the Arizona Broadband Mapping Project. To submit data the BP user logs in to the portal on the server, which can only be accessed by a unique username and password. The BP may use any web browser (Internet Explorer, Firefox, Safari or Chrome) to access the portal. After a successful login, the BP can "drag and drop" files to the browser window for upload. The BP user account is deactivated after successful transfer. The data is stored on an encrypted device in a secure facility. After data transformation and data examination and correction, along with related processing, the data is made available for review and verification by the BP user. The BP user can access and review the transformed data (as formatted for federal submittal in GIS readable format) and derived data (such as maps in PDF and KML formats) prior to its delivery to NTIA as part of DSCI's BP feedback process and for verification tasks

Data Flow
Broadband Mapping Project
Version 2



Notes: EFT/HTTPS server can only be accessed by a unique username and password. "Accounts" remain active during pending intake and feedback transfer. Server autobans any IP/user after three failed attempts.

Validation

Validation Overview

Collaborative Verification Process and Feedback Loop

Below is an outline of our Collaborative Verification Process and the checklist of review steps and topics covered in each session. Some 7 separate collaborative verification sessions were held utilizing GoToMeeting during the review of the Fall 2013 data for this submittal cycle.

- Processing Overview
    - Discuss any notifications or pending issues for data processing and verification
- Provider by Provider
    - Overview of Evaluation of Submitted Files
        - Review the QA spreadsheet and embedded notes
        - Note anything odd/unexplained about the processing
    - Statistical Comparison of Current vs. Previous Submittal
        - Number of Features by Tech Category.
        - Area or length of Features.
        - Compare number of Middle Mile points
    - Interactive Review
        - Look at and evaluate Tech and Speeds
        - Visual overlay of previous submittal with this one
            - Use Symmetrical Difference Layer to zoom to areas when needed
        - Note any significant differences or anomalies
    - Comparison with Verification Sources.
        - Look at Middle Mile points, if available
        - Look at American Roamer, Cable Boundaries/Media Maps, TeleAtlas, etc.
        - Look at Federal Crowdsource points and in/near/out statistics
        - Look at IDInsight points (optionally)
    - Zoom/Pan
        - Look at edges, especially and use previous overlay
    - Take snapshots, as needed for Provider feedback and verification
    - Capture Notes for Feedback Package and wiki.
    - Schedule any Provider interactive sessions and next DSCI interactive sessions
    - Review FTP site vs. what has been copied down locally
        - Do we have what we think we have?
    - Review workflow spreadsheet and update for steps complete and still pending for each BPs' data set

Validation Data Sources

FCC Form 477 Data: The FCC requires all facilities-based providers to submit a Form 477 data, which is then used to produce Local Telephone Competition and Broadband Data for analysis and reporting. The associated FCC Registration Number (FRN) is a key data identification and indexing element and the underlying data, though significantly limited in the desired broadband accuracy and granularity, has proved useful for identifying relevant Broadband Providers and as a starting point for some reverse mapping activities.

American Roamer: DSCI licenses American Roamer data for Arizona from Esri, which provides a substantial view of wireless voice and advanced services coverage patterns. The data set has proven of substantial use in cross checking mobile Broadband Providers' declared coverage and gaps. With the dynamic nature of the mobile industry and advancing 3G and 4G deployments, American Roamer data will be licensed on an ongoing basis to support DSCI verification activities.

Cable Boundaries/Media Maps: DSCI licenses Cable Boundaries data from Esri for Arizona for use as a primary verification source for cable wireline providers. It is based on information from MediaPrints developed by Direct Group and Warren Communications and updated quarterly. Cable Boundaries data provides current information about cable services by area and has data variables including primary ownership, subscribers, miles of plant, and digital capability. The data are available in a variety of geographies. Though initially useful in verification for comparing declared cable broadband coverage, it generally has proved to grossly overestimate the BPs broadband service territory and is a coarse tool of limited utility.

TeleAtlas Central Offices & Wire Centers: DSCI licenses TeleAtlas Central Offices & Wire Centers from Esri for ILEC and CLEC base facilities identification. Such data is available from a variety of sources and tends to remain relatively constant over time. Also, since it doesn't capture Digital Subscriber Line Access Multiplexer (DSLAM) locations, it must be complemented by other means to be useful in verifying wireline LEC coverage and gaps.

Wireless Applications, Corp. SiteSync: PowerSearch manages queries to multiple databases including FCC, FAA, licensed microwave, and tower companies to look for structures or towers placed in designated areas and often reveals the specific broadband providers collocating on those towers. eCoverage projects signal propagation and terrain coverage using high-resolution terrain data and Longley-Rice frequency calculations through an easy to use downlink coverage and contour generator with easily adjustable parameters like antenna, azimuth height, frequency, and power.

Federal Crowdsourced Data: The FCC offers an online Consumer Broadband Test (http://www.broadband.gov/qualitytest/about/) to give consumers additional information about the quality of their broadband connections and to create awareness about the importance of broadband quality in accessing content and services over the internet. The FCC complements the data collected from the Consumer Broadband Test with the submitted street address and other data, aggregating it to several monthly files grouped by State and available for secured download. DSCI processes the wireline and wireless results files, converting IP addresses to named Broadband Providers, and otherwise prepares the data for use in collaborative verification procedures. These data sets have proved extremely useful in confirming declared and/or estimated BP coverage and speeds, leading to detection of core data anomalies and issues that have largely been corrected with BP participation, thus yielding much more accurate and reliable data submittals. Note that a new State speed test has launched and Mobile Pulse

contracted with for specialty mobile wireless speed testing going forward per details below in the Arizona Broadband Policy Initiatives section. It is anticipated the complementary speed testing results in greater abundance will greatly enhance verification veracity and policy analysis capabilities.

State Crowdsourced Data: In March 2013, ASET launched an Arizona broadband speed test and associated campaign designed to gather critical broadband metrics and serve the public. Arizona licensed the core speed test capabilities from Ookla and created a portal for end users to test their connections, answer some mandatory questions, and optionally answer additional survey questions. Over 7,000 records were available and processed for use in verification for the Fall 2013 cycle, but only about 53% of those were able to be geocoded as addresses were not always satisfactory or an intersection or nearby landmark were entered by the end user.

ID Insight Crowdsourced Data: DSCI previously licensed the BroadBand Scout database from ID Insight for all 15 Arizona counties. ID Insight uses proprietary analytic modeling, demographic data, and retail Internet order data that include physical and IP addresses, to detail consumer access types and transmission speeds keyed to geographic locations which contribute to our verification views of BP footprints and coverage gaps. To date, this data source has proved complementary to the FCC crowdsourced data and only contributed incremental knowledge and detection of data set anomalies in a limited number of cases. However, detailed review of IP addresses and BPs has led to the identification of several additional relevant BPs that have since been successfully engaged by DSCI. The legacy data set is only occasionally referenced in current verification processes, especially when good density federal speed test data is unavailable.

Arizona Broadband Map

Arizona Broadband Map Overview

The Arizona Broadband Map features two interfaces, one for the general public and another for community planners or more advanced users. Both versions of the map allow substantial flexibility and usability in navigating to, framing, selecting data, and customizing views.

The Arizona Broadband Map (Basic) is a public map at http://broadbandmap.az.gov/map/ that provides a detailed and multi-layered map showing the availability and advertised performance of High Capacity Digital Services (Broadband) in the State of Arizona by individual street address or at any point selected. Links are provided to the broadband providers' websites when the provider is identified as one of those serving an address or location.

The Community Broadband Planning Map at http://broadbandmap.az.gov/CommunityPlanningMap/ includes a large collection of map layers with a rich set of Spatial Analysis Tools to help community planners make better broadband decisions for their community. The powerful application has Population and Housing data down to the Census Block level. Community broadband consultants have also prepared profile spreadsheets for each Arizona community which are linked from the map and downloadable.

Both the Basic and Community Broadband Planning mapping applications use ArcGIS Server Technology from Esri, and are accessible by anyone with an Internet connection.

Arizona Broadband Map Details

The Community Broadband Planning Map was designed to help Community Planners make better broadband decisions for their community and other advanced users optimize and exploit the available data. The central idea behind this added map version was to present a set of tools that would help a planner identify their study area, find all combinations of Broadband Providers, Service Types and Advertised Download/Upload speeds, and quickly chart out the Population and Housing data showing the number of people, average median age, households, average household size, total area, etc.

What makes Arizona's Community Planning Map unique is the power and flexibility it gives users to perform spatial analysis. For example, users can perform a spatial search to find all the Libraries within a specific Zipcode. Subsequently, a 2-mile buffer can be drawn around a Library to find all the public schools that fall within this 2-mile radius. The Advertised Upload and Download Broadband Speeds and Service Types to these schools can be instantly charted. Further, all the Census Blocks falling within this 2-mile buffer can be selected and their attributes can be exported to a spreadsheet. Users can easily determine the number of people living within 2 miles of a Library; find their average median age, the total number of households, etc.

All of Arizona's Broadband Providers and their associated metrics can be easily viewed and the results saved as a Comma or Tab Delimited File for further analysis. A Community Planner can readily measure the area and perimeter of their community; find the distance from the nearest Central Office, or major road or highway; and quickly view the Broadband footprints of every provider in the vicinity. Spatial Searches can be made based on a Census Block, Census Block Group, Census Tract, Zipcode, City or Town, or any arbitrary polygon drawn on the map.

Once a search area is defined, users can easily locate Community Anchor Institutions (CAIs) including Schools, Libraries, Hospitals, Fire Stations, Police Departments, etc., falling within this area and draw buffers around selected features, to continue the spatial search process and preparation of map views with great utility.

Arizona Broadband Map Tutorials

Twenty-three tutorials on how to use various features of the map are available on a dedicated YouTube channel at http://www.youtube.com/user/ArizonaBroadband. In addition to providing instructions on how to use the map they demonstrate functions such as:

- Finding an Address,
- Identifying Broadband Providers,
- Displaying the Map Layers,
- Identifying Community Buildings,
- Buffering Points,
- Graphical Search,
- Text Search,
- Spatial Search and
- Using the Select Widget.

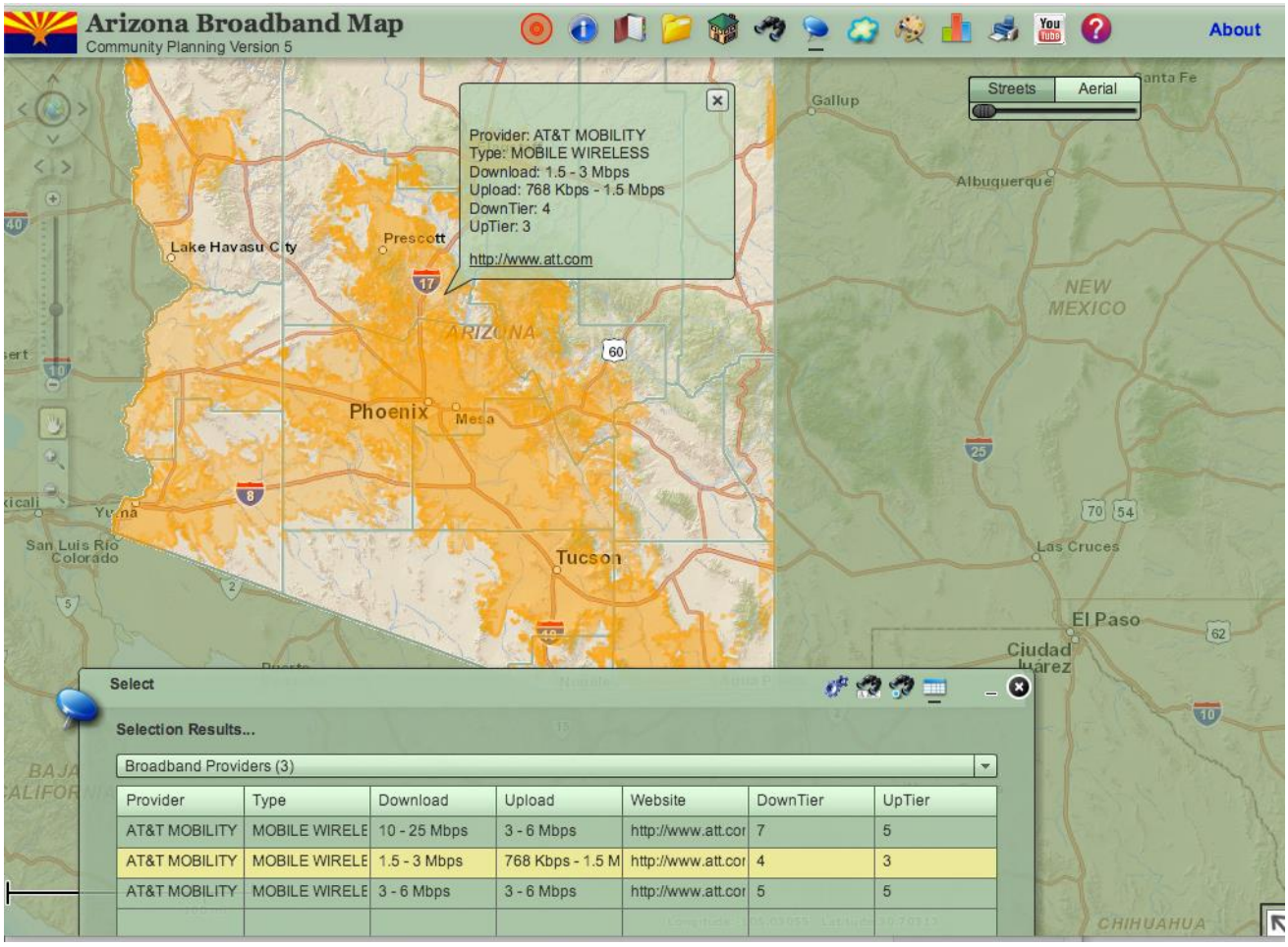
Some of the latest features added include the capability to build an SQL statement to display the Broadband Footprints of a specific Provider. For example, one can:

- Display the Broadband Footprints of a selected BP such as AT&T Mobility, showing all their speed tiers;

- Further modify the SQL Statement to display only Download Speed Tier = 7, which helps to display just the 4G coverage areas of AT&T Mobility;
- Save your SQL Statements to Notepad for later use;
- Build similar SQL Statements to display the 4G coverage areas of some other carrier, such as Verizon; and
- Display the combined 4G coverage areas of AT&T and Verizon.

We believe we are unique among the 50 States to have this mapping capability to isolate and display Broadband Coverage areas by a given BP and a given Speed Tier.

The screen shot below shows one of the earlier stages of the above example process.



All Arizona Broadband Map layers in ESRI shape file format are made available for use by any interested parties under ArcGIS Explorer Desktop or other GIS platforms/toolsets at http://broadbandmap.az.gov/web/shapes/list.htm with a support document available at http://broadbandmap.az.gov/web/shapes/ArcGIS_Explorer.pdf.

A set of KMX files optimized for utilization under ArcGIS Explorer Desktop, Google Earth or similar tools are made available for use by any interested parties at http://broadbandmap.az.gov/web/KMZ/list.htm with a support document available at http://broadbandmap.az.gov/web/KMZ/GoogleEarth.pdf.

Arizona Broadband Policy Initiatives

We have been engaged as partners in various Arizona broadband grant related initiatives, some of which are described below:

The State of Arizona, through the Arizona Strategic Enterprise Technology Office (ASET - http://aset.azdoa.gov/), continues to define and develop an array of broadband policy and planning initiatives including a Digital Arizona Council (DAC) comprised of government, institutional, and private sector participants. The ASET team has involved many in the broadband provider community in discussing Arizona broadband deployment issues and working towards creative and effective solutions. There are six established DAC Task Forces. The DAC Strategic Planning Task Force developed a draft Arizona Broadband Strategic Plan that can be found in three versions of varying length at http://www.digitalarizona.gov/Digital_Arizona_Council/Strategy.html.

ASET has continued to evolve the Arizona Broadband Project Portal also hosting the Digital Arizona Project content and resources at http://www.digitalarizona.gov/ as a home base for DAC and this project as well as other broadband initiatives. Due to emerging ADOA standards for Arizona agency websites, it is expected the site will be redesigned for compliance going forward.

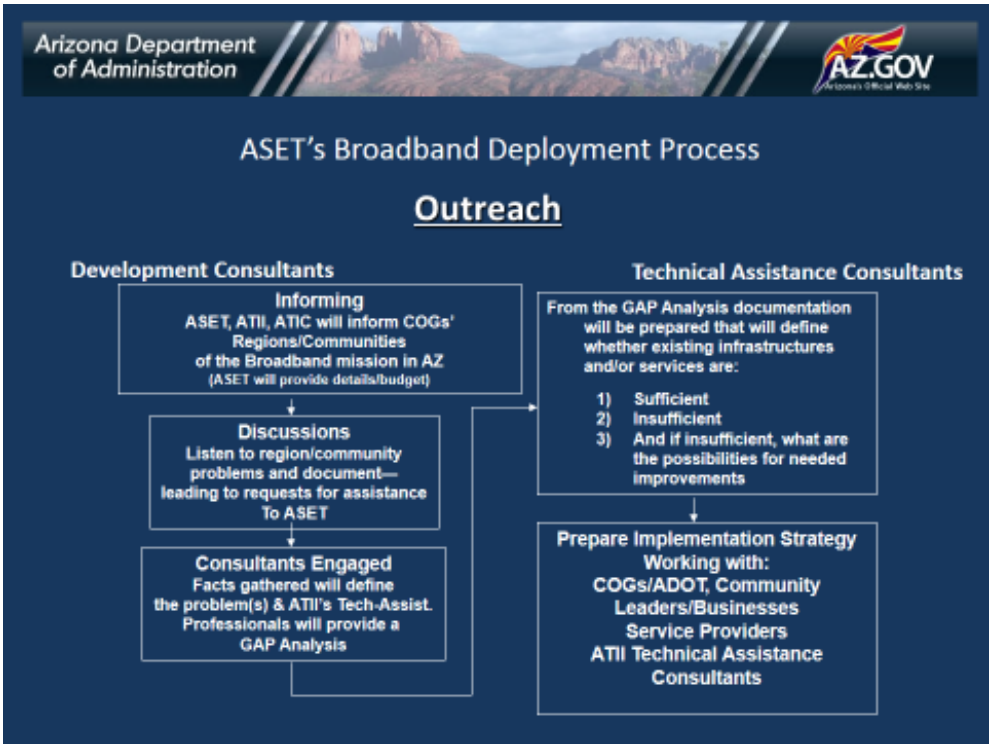
In March 2013, ASET launched an Arizona broadband speed test and associated campaign designed to gather critical broadband metrics and serve the public. Arizona licensed the core speed test capabilities from Ookla and created a portal for end users to test their connections, answer some mandatory questions, and optionally answer additional survey questions. The speed test and associated survey is being used by the Arizona State Lottery system to obtain actual performance numbers from users who access the Lottery website. One of our partners, the non-profit Arizona Telecommunications and Information Council (ATIC) at http://arizonatele.com/, has donated several iPads as prizes randomly awarded among those who take the speed test and the survey. The Arizona Department of Education (ADE) is also soliciting participation from all Arizona teachers and staff personnel as are the community broadband consultants and other partners. Over 7,000 records were available and processed for use in verification for the Fall 2013 cycle, but only about 53% of those were able to be geocoded as addresses were not always satisfactory or an intersection or nearby landmark were entered by the end user.

In order to enhance the breadth of sources available for gathering speed test data, ASET has contracted with Mobile Pulse, Inc. (http://www.mobilepulse.com/), who provides tools for mobile broadband measurement and analytics. The Mobile Pulse app is installed on mobile devices to periodically collect network performance data in the background and securely sends it to Mobile Pulse. Gathered data is analyzed and clearly presented on a web-based dashboard featuring detailed maps, comparisons and reports, as well as being made available for download for post processing and analysis. A campaign to enlist public safety community participation and that by other select communities and the general public is pending.

The Arizona State Land Department (ASLD) is maintaining the related Arizona Broadband Map at http://broadbandmap.az.gov/map/ loaded with the last broadband data set. Additionally, there is a special Community Planning version of the broadband map available at http://broadbandmap.az.gov/CommunityPlanningMap/ and loaded with demographic data and special analysis tools that will aid community broadband analysis and planning. These tools are designed to mutually serve both Arizona's broadband consumer and provider communities, as

well as contribute to State policy and strategic planning. It should help lead consumers to provider web sites and information about their broadband offerings, hopefully becoming an important tool in the BPs' marketing efforts. A variety of documentation and demonstration videos have been developed to support end user learning and use. The underlying broadband information is made publicly available as both ESRI shape file layers and KMZ files.

Arizona's rural communities are now receiving Community Broadband Planning and Technical Assistance help. ASET and its non-profit partner, the Arizona Telecommunications & Information Institute (ATI Institute - http://aztii.org/), have qualified and approved a cadre of consultants from which several have been selected by regional government coalitions to provide broadband gap assessment, strategic planning, technical assistance, and grant writing, broadband training and assistance across Arizona's rural areas. Regional broadband steering committees have been formed with broad participation among regional economic development, educational technology, transportation, government IT, healthcare, and public safety stakeholders. Round 1 activities have now been completed in all four rural regions of the State and Round 2 activities extending to mid-2014 should launch shortly with a focus on regional transportation infrastructure relative to broadband deployment and a number of specific focus areas or projects within each region.



An Essential Infrastructure for Information Delivery study was performed by DSCI in the fall of 2011 and produced an Arizona roadmap for reducing barriers based in Arizona law, policy, and rules hindering establishing public rights-of-way as essential infrastructure for information delivery. Herein, we identify the many Right-of-Way (ROW) issues encountered by government, industry, and broadband customers, both commercial and residential and offer up insight on current trends, national policy evolution, and the State of Arizona's opportunities to undertake positive actions where appropriate and practical.

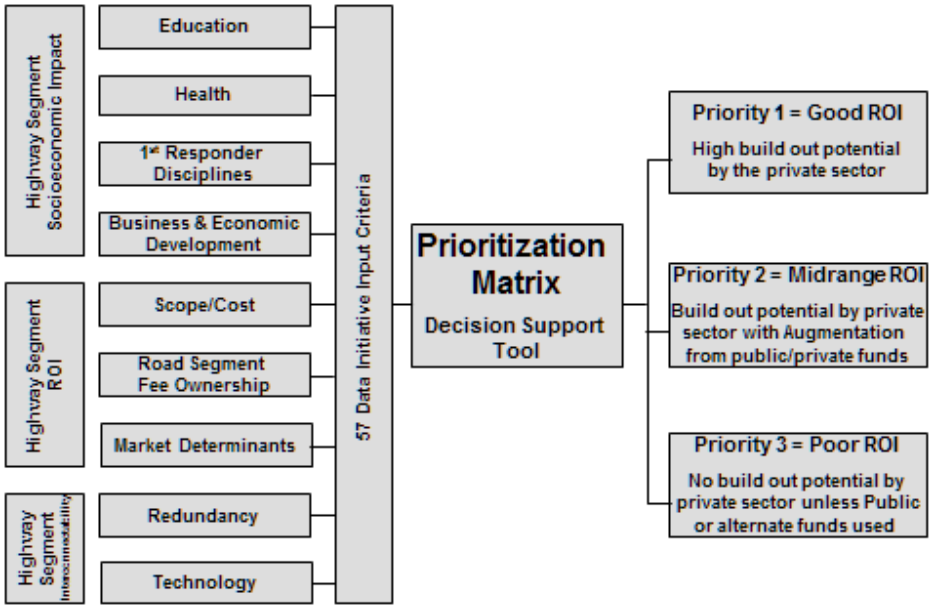
The Essential Infrastructure for Information Delivery study seeded the opportunity for ATIC to develop and drive new legislation, Arizona SB1402, the Digital Arizona Highways Bill, which was passed and signed in the 2012 legislative session. Specifically, the bill expands existing rules

governing ADOT's management of State ROW to include transportation-of-information as well as vehicles and to make available conduits in the ROW to private broadband providers on a cost-recovery basis. The result will be more utilization and streamlined access to the ROW for constructing broadband conduits, thereby accelerating and improving availability of broadband services to unserved areas of Arizona. ASET and ADOT are working together to launch one or more demonstration projects deploying fiber conduit along state highways in cooperation with providers to provide critical middle mile digital capacity for mobile wireless backhaul, community fixed wireless delivery, and support of other connectivity needs.

Because of the passing of SB1402 ASET's SBDD program is working closely with our Public Safety Interoperable Communications (PISC) Office which has responsibility for FirstNet planning and outreach. This office also reports to the state CIO and is exploring synergistic ways of using SB1402 to potentially lower the costs of expanding rural backhaul infrastructure for use by FirstNet and also sharing those expanded resources to benefit educational, healthcare, and economic development uses in rural communities.

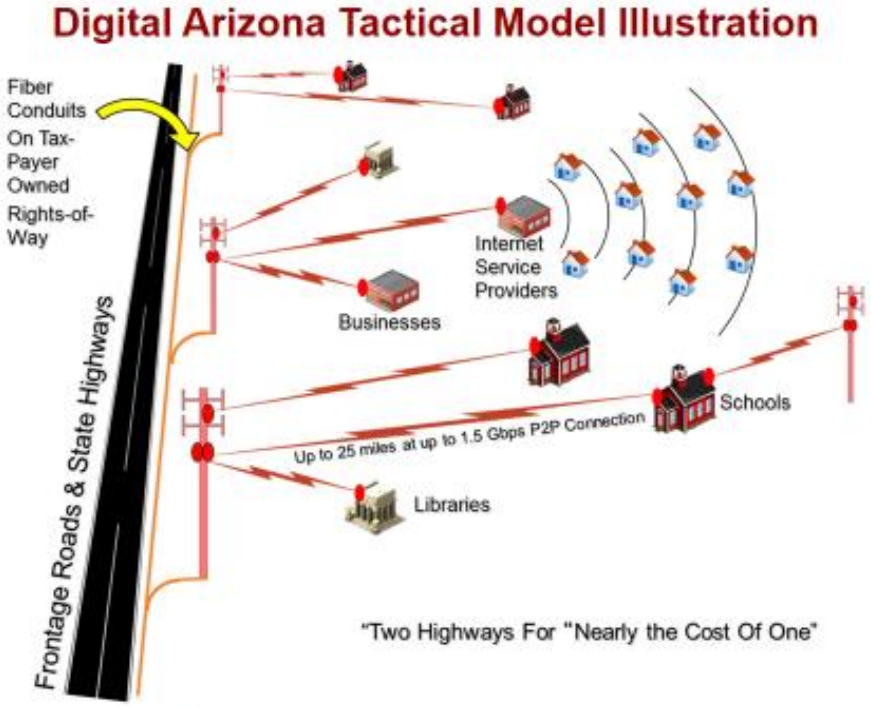
ASET has developed a Highway Conduit Deployment Prioritization Matrix to support the evaluation and prioritization of the Digital Arizona Program (DAP) Proof-of-Concept demonstrations and support statewide conduit buildout staging and sequencing processes. The Prioritization Matrix tool assists the decision making process by analyzing some 90+ individual road segments rather than individual communities as the basis for evaluation. It supplies empirical (data driven) analysis rather than subjective evaluation methods incorporating some 59 prioritization matrix data variables. The Prioritization Matrix supports a Management by Objective (MBO) framework oriented around three high level objectives:

- Highway segment socioeconomic impact (Educ., Health, Public Safety, Econ. Dev. [cell towers, application readiness])
- Highway segment ROI (Scope/Cost [terrain], Ownership, Market Determinants [population, demand, current infrastructure])
- Highway segment interconnectability (Technology [carrier hotels along segment], SONET Ring viability and redundancy [does it further an interconnect])



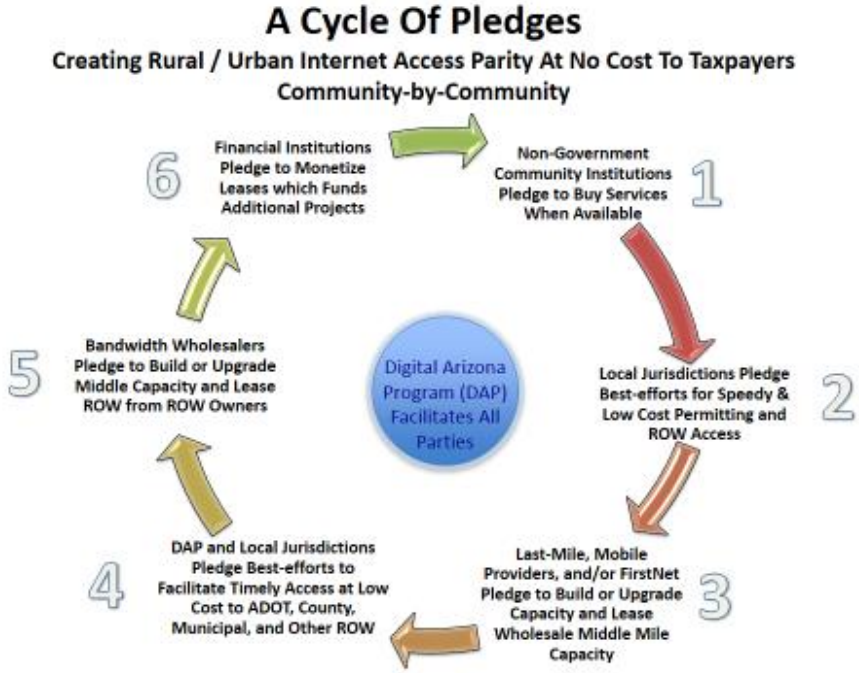
ASET and DSCI have several interns working at ADOT to review land ownership and use along State highways as divided into a number of road segments and capture relevant data and associated documents.

An example of a tactical model being developed and promoted in Arizona is where middle mile fiber is available or freshly deployed in highway ROW to feeds tower from which mobile and fixed wireless broadband can be distributed to nearby communities and populations.



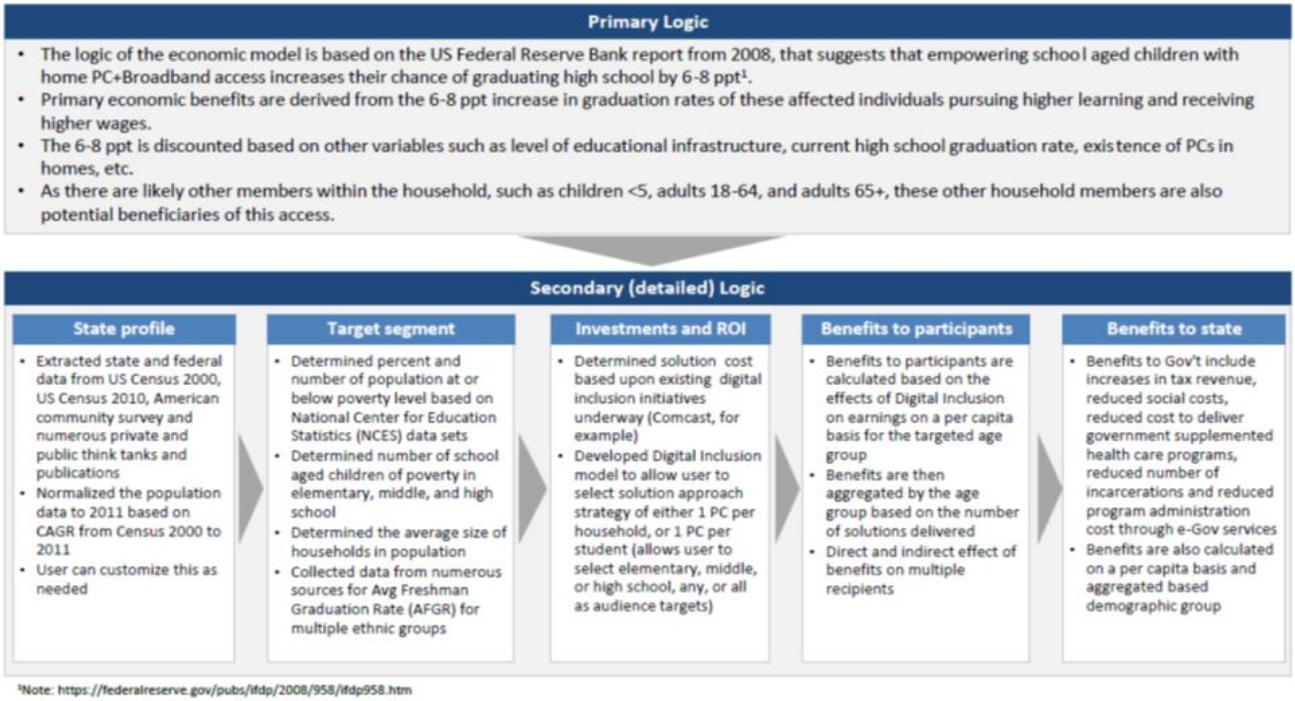
Source: Arizona Strategic Enterprise Technology Office (ASET)

Regional broadband planning has introduced an innovative method for leveling the playing field, creating Internet access parity between rural and urban communities, and benefiting the private sector providers involving securing pledges of support from the various stakeholders including the community institutional users, local government entities, broadband providers, Arizona state government agencies, banks and investment institutions, and end users. This can be accomplished at the community level at no additional cost to taxpayers and improve the ROI for broadband providers considering new investments as illustrated below as a cycle of pledges.



Another significant piece of legislation related to broadband in rural areas, SB1353, the telemedicine parity bill, was promoted by our partner ATIC and was signed into law by the Governor in 2013. It requires private health insurers to provide coverage in rural communities for services delivered via telemedicine at a comparable rate to those provided in person. Services covered include trauma, burns, cardiology, infectious diseases, mental health disorders, neurological diseases and dermatology. Significant collaboration between healthcare stakeholders and telemedicine interests built a coalition and solid support for the bill.

ATI Institute partnered with Microsoft Corporation (http://www.microsoft.com/) and their Shape the Future team to have a Digital Inclusion Economic Impact Model for Arizona executed by their partner The Arnold Group (http://www.the-arnold-group.com/) at no cost to ATI Institute or the State. The model is designed to measure the economic impact of digital inclusion initiatives and has been performed across the U.S. in five states and seven cities to date including Arizona. Now that the statewide study is complete, the tool as provided to ATI Institute can be freely used with local communities by government, consultants, and the communities themselves, so they too can begin to understand the benefits of digital inclusion at a local level.



ASET and ASLD are committed to using the NTIA grant to realize significant insights to the Arizona broadband environment and provide real benefits to broadband providers in identifying unserved and underserved markets, easing regulation and right of way issues, and otherwise contributing to robust broadband availability and favorable broadband provider environment.

Appendix A - Data Submittal Technical Appendix for Fall 2013

Introduction

This document provides broadband data specifications and delivery options for the **Arizona Broadband Assessment Project (AZ BAP)**, which is part of the nationwide **National Telecommunications Information Agency (NTIA)** Broadband Data and Development Program in cooperation with the **Federal Communications Commission (FCC)** through the **American Recovery and Reinvestment Act (ARRA)**. This document is designed to inform and support Arizona's **Broadband Providers (BPs)** who are submitting biannual broadband coverage data. Additional assistance is available through our contact information below.

The Arizona Broadband Assessment Project (AZ BAP) is managed by the **Arizona Strategic Enterprise Technology Office (ASET, formerly GITA),** in conjunction with the **Arizona State Land Department (ASLD)** to meet federal data submittal requirements and contribute to an overall national broadband map and complementary state broadband map, as well as to inform Arizona policy makers and help determine where future improvements in policy, process, and infrastructure should be supported in the State. **Data Site Consortium, Inc. (DSCI)** is acting as the State's Contractor to assist in support of this broadband assessment initiative.

Overview

Under the NTIA program, each **Broadband Provider (BP)** is requested to provide information regarding the availability, technology of transmission and downstream/upstream speed of broadband services if their company or organization:

- Offers broadband services to end users in Arizona, or could do so within a typical service interval without extraordinary effort, or
- Owns facilities in Arizona that make possible the delivery of broadband services by other companies meeting the description above.

Throughout this document, we address how data may be formatted and securely transferred to the State of Arizona through DSCI. The availability and validity of your data is critical to portray your broadband coverage accurately. After reviewing your submitted data, we will get back to you with any questions and feedback, as well as access instructions to download the processed data in map display and GIS formats.

While we ask every BP to submit data in the NTIA format described below, we recognize the significant effort this may require. Ultimately, we seek the data in a format easiest and most practical for the BP and we're glad to provide support in the preparation and submittal of the data. Where possible, we're requesting your data submittal reflect your complete coverage rather than indicating incremental changes from a prior submittal. A "full" submittal of complete data is much more straightforward and less error prone to work with. Please note:

- As broadband technologies and deployments continue to evolve, the NTIA has expanded and/or shifted the acceptable speeds for some technology types. Please see the updated Technical Appendix and new speed vs. technology type chart for more information, especially if you're now delivering higher broadband speeds than previously.

- The federal requirements have shifted to protocols based on Census 2010 census blocks and coding. If you haven't made the shift from earlier versions, we'll be glad to help or work with you in transforming and verifying your data in the newer format.

It is imperative that we capture as much information that correctly depicts a particular coverage area. Where available, provide "homes passed" information or areas that may not have current customers, but are serviceable. ***Beyond your broadband coverage data, the State would like us to collect information as to the actual customer addresses passed or served by you.*** See further details in this Technical Appendix and/or contact us to discuss.

In addition to your broadband coverage data, the State would like us to also collect information as to your number of customers in Arizona for each broadband technology and speed tier you provide and the range of pricing. A convenient table is included in the accompanying cover letter that we would like you to fill out and return via e-mail or mail

Provider data may be uploaded to DSCI and the State of Arizona through a simple, safe, and secure website at https://www.azbbmp.com/. Each provider will be given a unique username and password that will be active only during the submittal period and again when your processed data is ready for your download and review. Refer to page 10 of this document for additional details.

Definitions

"Broadband service" is the provision, on either a commercial or noncommercial basis, of data transmission technology that provides data transmission to and from the Internet with advertised speeds of at least 768 kilobits per second (kbps) downstream, and greater than 200 kbps upstream, to end users.

A "facilities-based" broadband provider offers service connections to end user locations if the company or organization:

1. Owns the portion of the physical facility that terminates at the end user location
2. Obtains unbundled network elements (UNEs), special access lines or other leased facilities that terminate at the end user location and supplies or equips them as broadband, or
3. Supplies or equips a broadband wireless channel to the end user location over licensed or unlicensed wireless spectrums including satellite transmission.

For this purpose, "broadband service" is "available" at a location if the provider does, or could, within a typical service interval (7 to 10 business days) without an extraordinary commitment of resources.

An “end user” of broadband service is a residential or business party, institution, or state or local government entity that may use broadband Internet service for its own purposes, and that does not resell such service to other entities or incorporate such service into retail Internet-access services that it provides. (For this purpose, Internet Service Providers “ISPs” are not “end users.”)

Requested Data

The State of Arizona asks that each BP contribute detailed data for both their wireline and/or wireless coverage areas. In addition to coverage areas, information regarding transmission technology, upstream and downstream speed is also requested.

All data submittals should include “common” information, including,

1. Technology of Transmission
2. Speed (Upstream/Downstream)
3. FRN (FCC Registration Number)

Technology of Transmission

The technology of transmission refers to the methodology or platform(s) by which a BP services their customer. The NTIA has developed a “model” where specific codes depict different technologies:

Code	Description
10	Asymmetric DSL
20	Symmetric DSL
30	Other Copper Wireline - T1, NxT1, EOC
40	Cable Modem - DOCSIS 3.0
41	Cable Modem - Other
50	Optical Fiber or Fiber to the End User (FTTx)
60	Satellite
70	Terrestrial Fixed Wireless - Unlicensed
71	Terrestrial Fixed Wireless - Licensed
80	Terrestrial Mobile Wireless
90	Electric Power Line
0	All Other

Speed Tables

Speed of Broadband service(s) should be specified as both maximum advertised upstream and downstream speeds as well as “typical” speeds achieved by end users. The NTIA has established a set of codes for upstream and downstream bandwidth speeds:

Speed Tier Codes Table		
Upload Speed Tier	Download Speed Tier	Description
2	n/a	Greater than 200 Kbps and less than 768 Kbps
3	3	Greater than or equal to 768 Kbps and less than 1.5 Mbps
4	4	Greater than or equal to 1.5 Mbps and less than 3 Mbps
5	5	Greater than or equal to 3 Mbps and less than 6 Mbps
6	6	Greater than or equal to 6 Mbps and less than 10 Mbps
7	7	Greater than or equal to 10 Mbps and less than 25 Mbps
8	8	Greater than or equal to 25 Mbps and less than 50 Mbps
9	9	Greater than or equal to 50 Mbps and less than 100 Mbps
10	10	Greater than or equal to 100 Mbps and less than 1 Gbps
11	11	Greater than or equal to 1 Gbps

Please note that, for a particular transmission technology, not all speeds are applicable, and submitted data will be checked against the NTIA established applicable speeds for each technology type. Please review the table below for acceptable speed values by technology.

		NTIA Speed Tier Codes									
		2	3	4	5	6	7	8	9	10	11
		> 200 K < 768 K	> 768 K < 1.5 M	> 1.5 M < 3 M	> 3 M < 6 M	> 6 M < 10 M	> 10 M < 25 M	> 25 M < 50 M	> 50 M < 100 M	> 100 M < 1 G	> 1 G
NTIA Technology Codes											
10	Asymmetric xDSL	Maximum Upstream Range									
			Maximum Downstream Range								
20	Symmetric xDSL	Maximum Downstream Range									
			Maximum Downstream Range								
30	Other Copper Wireline	Maximum Upstream Range									
			Maximum Downstream Range								
40	Cable Modem - DOCSIS 3.0	Maximum Upstream Range									
									Max Down Range		
41	Cable Modem - Other	Maximum Upstream Range									
			Maximum Downstream Range								
50	Optical Carrier/Fiber to End User	Maximum Upstream Range									
			Maximum Downstream Range								
60	Satellite	Maximum Up Range									
			Maximum Down Range								
70	Terrestrial Fixed Wireless - Unlicensed	Maximum Upstream Range									
			Maximum Downstream Range								
71	Terrestrial Fixed Wireless - Licensed	Maximum Upstream Range									
			Maximum Downstream Range								
80	Terrestrial Mobile Wireless	Maximum Upstream Range									
			Maximum Downstream Range								
90	Electric Power Line	Maximum Upstream Range									
			Maximum Down Range								

FCC Registration Number (FRN)

We ask that each BP provide their FCC Registration Number(s) (FRN). If any BP has more than one FRN, we ask that each data set submitted be tied to one and only one FRN. BPs will multiple operating entities and FRNs can work with us in best reflecting their broadband coverage consistent with their corporate identity and marketing. If in doubt concerning your FRN, please visit https://fjallfoss.fcc.gov/coresWeb/simpleSearch.do for verification.

Wireline Broadband Coverage

Wireline coverage area may be reported by any of the following:

1. Individual street address* where broadband service is available to end users.
2. Road Segments, *allowable only for areas where census blocks are greater than 2.0 square miles in area, using:*
    a. Arizona road centerline data - shape file format road segments from current local sources are preferred, including all NTIA required fields for address ranges (minimum and maximum address on the segment), street prefix direction, street names, street type, street suffix direction, city, ZIP5 and ZIP4 (if available), with each element in a separate field. Alternatively, each segment can be identified in a table (non-GIS format) with a beginning and ending address range, street prefix direction, street name, street type, street suffix direction, city and ZIP codes in separate fields. Please note that a segment identifier (ID) field to your street network segments will not help us as we do not have access to that network.
    b. US Census TIGER/Line Road Files - shape file format road segments from the latest Census TIGER files (2009 or 2010) including all NTIA required fields for address ranges, street prefix direction, street names, street types, street suffix direction, city, etc. Alternatively, each segment can be identified in a table (non-GIS format) with a TIGER Line ID (TLID) for the 2009 or 2010 version of Census TIGER files. BPs should indicate which Census version (2009 or 2010) was used in preparing the submittal.
3. Census block, *allowable only for areas where census blocks are less than or equal to 2.0 square miles in area.*

* *Please note that in all cases, wireline broadband availability will be aggregated to Census Block (for blocks <= 2 square miles) or Street Segment (for blocks > 2 square miles) as per the NTIA specifications,* ***and in no case will specific addresses be included in the Arizona or federal broadband maps.***

* *Please note that federal requirements have shifted to protocols based on Census 2010 census blocks and coding. If you haven't made the shift from earlier versions, we'll be glad to help or work with you in transforming and verifying your data in the newer format. When providing data coverage by Census Block, please specify 2000, 2009 or 2010 census information to correctly identify the Census Block FIPS code.*

For those providers who wish to submit FCC Form 477 data, it is imperative that we have information that is more granular than census tract data. We will work with you to review, verify, and adjust such data to properly reflect your broadband coverage.

Any provider offering service boundary/areas, please make it available to DSCI in an appropriate GIS (Geographical Information System) format such as an ESRI shape file or Google Earth file (KML/KMZ).

Wireline Data Format

By Address - Defined as broadband service available, including service type and advertised speed, to a specific "end user" by physical address. Typical submittal formats include excel spreadsheets, flat text files (.csv or .txt) and database tables (Access or SQL). Data should represent the following fields:

FRN	Address	City	State	ZIP4	Technology of Transmission	Maximum Downstream Speed	Maximum Upstream Speed	Typical Downstream Speed	Typical Upstream Speed
19567460	123 Main St	Here	AZ	88888	10	6	2	5	2
19567460	222 1st Ave	There	AZ	88800	41	5	2	4	1
19567460	445 Elm St	Every	AZ	87654	50	10	7	9	7

Where possible, include the category of end user by the following:

Code	Description
1	Residential user
2	Governmental user
5	Other

By Census Block - In lieu of reporting address-specific data, BPs may provide list of all census blocks, **two square miles or less in area,** in which broadband service is available to end users, along with the same service characteristics address points contain (technology of transmission and maximum and typical speeds).

If this option is employed, BPs are encouraged to use geographic information system (GIS) compatible software to select a subset of census blocks. Please include the full 15 digit FIPS (Federal Information Processing Standards) Census Block ID. These can be identifiers for Census 2009 or 2010 Census Blocks, however please specify which version was used. GIS formats for these resources can be found at the U.S. Census Bureau download sites:

- US Census Bureau's 2009 TIGER/line files at http://www.census.gov/geo/www/tiger/tgrshp2009/tgrshp2009.html
- US Census Bureau's 2010 TIGER/line files at http://www.census.gov/geo/www/tiger/tgrshp2010/tgrshp2010.html

Data should represent the following fields:

FRN	Census Block 15-digit FIPS	Technology of Transmission	Maximum Downstream Speed	Maximum Upstream Speed	Typical Downstream Speed	Typical Upstream Speed
19567460	40059412001036	10	6	2	5	2
19567460	40159501003174	41	5	2	4	1
19567460	40139410001010	50	10	7	9	7

By Road Segment - in lieu of reporting address-specific data, BPs may report a list of street segments with address ranges in which broadband service is available to end users along with the same service characteristics address points (technology of transmission and speed).

If this option is employed, BPs are encouraged to use geographic information system (GIS) compatible software to select a subset of road segments (from either of the GIS datasets listed below). The basic service information fields (Technology of Transmission, Maximum Advertised Downstream/Upstream speed and Typical Downstream/Upstream speed) should then be attached to each road segment to characterize the broadband service along each road.

US Census Bureau TIGER/line shape files can be accessed at the previously listed sites. Again, please report which data set was used in preparing your data.

FRN	Min Address	Max Address	Prefix Dir	Street name	Street type	City	State	ZIP
19567460	1	100	E	Easy	Ln	Here	AZ	88888
19567460	101	250	E	Easy	Ln	Here	AZ	88888
19567460	301	399	W	First	St	There	AZ	87654

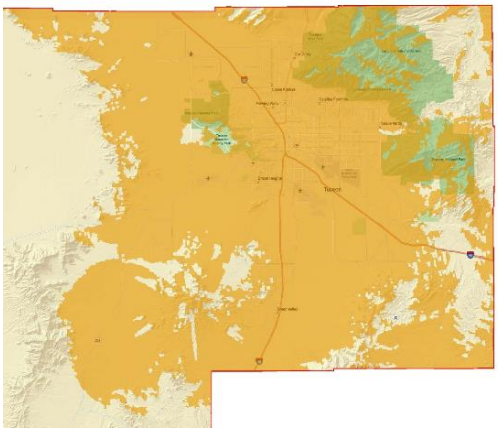
Wireless Broadband Cover - Fixed, Mobile & Satellite

We would prefer that all information submitted for this requirement is in a **geographic data format with polygons depicting wireless service areas** and associated service characteristics (technology of transmission, speed), but may be reported by any of the following:

1. ESRI shape file
2. Google Earth as either .kml or .kmz
3. Tower location, including
   a) Latitude and Longitude
   b) Tower height and/or Equipment height
   c) Spectrum Used
   d) Antenna specifications (omnidirectional, sectorized, etc.) - if using sectorized, provide Azimuth direction and beamwidth (60 degrees, 90 degrees, 180 degrees)

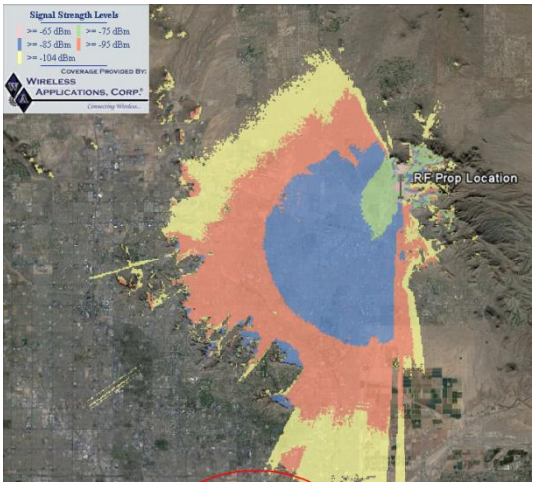
ESRI Shape File

Please include attribute fields or metadata depicting technology of transmission, lat/long, tower height and maximum upstream/downstream speeds.



Google Earth

Please include metadata depicting technology of transmission, lat/long, tower height and maximum upstream/downstream speeds.

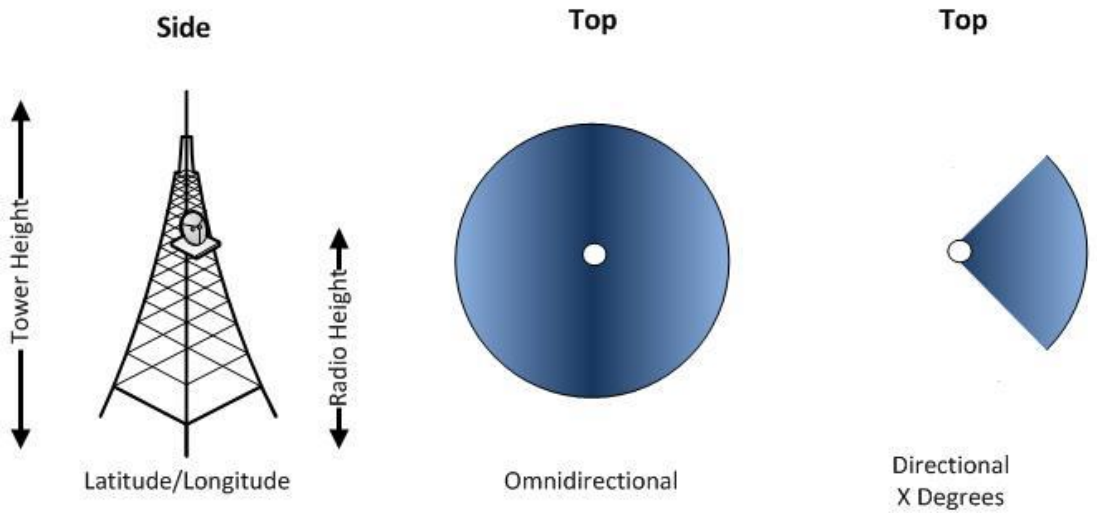


Tower Location

For BPs that do not have coverage data in a geographical/polygon format, a description of tower location with lat/long, height, spectrum, azimuth, radiated power, and speed as follows:

Tower Height/Equipment (ft)	FRN	Latitude	Longitude	Technology of Transmission	Maximum Downstream Speed	Maximum Upstream Speed
100/60	0019567460	33.419028	-112.142889	70	5	3
70/60	0019567460	32.995917	-111.745806	70	5	3
50/50	0019567460	35.241944	-111.610722	71	6	4

*include typical upstream/downstream where possible



Wireless Spectrum

The NTIA has developed specific codes for wireless spectrum use, as follows:

Code	Description
1	is Cellular spectrum (824-849MHz; 869-894) used to provide service
2	is 700 MHz spectrum (698-758 MHz; 775-788 MHz; 775-788 MHz) used to provide service
3	is Broadband Personal Communications Services spectrum (1850-1915 MHz; 1930-1995) used to provide service
4	is Advanced Wireless Services spectrum (1710-1755 MHz; 2100-2155) used to provide service
5	is Broadband Radio Service/Educational Broadband Service spectrum (2496-2690 MHz) used to provide service
6	is Unlicensed (including broadcast television "white spaces") spectrum Used to provide service
7	is Specialized Mobile Radio Service (SMR) (817-824 MHz; 862-869 MHz; 896-901 MHz; 935-940 MHz)
8	is Wireless Communications Service (WCS) spectrum (2305-2320 MHz; 2345-2360 MHz), 3650-3700 MHz
9	Satellite (L-band, Big LEO, Little LEO, 2 GHz)

Support

Please direct any questions regarding this document, in its entirety, to:

Nolan Straabe, Data Site Consortium, Inc.
E-mail: nolan@straabe.com, Mobile: 602-999-0143

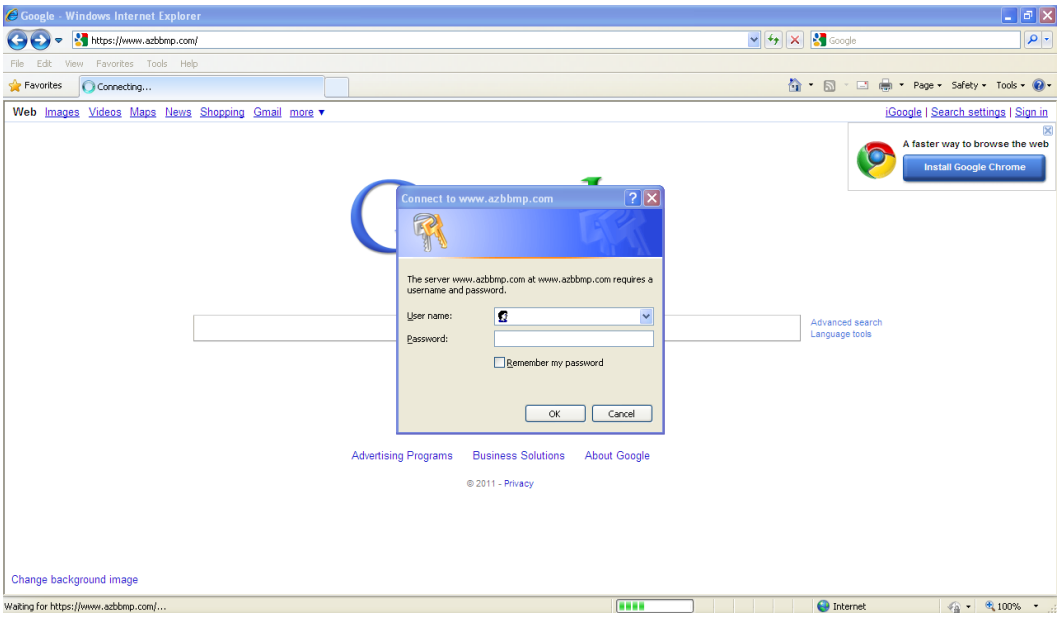
Arizona Broadband Provider Services Portal

http://www.azbbmp.com/

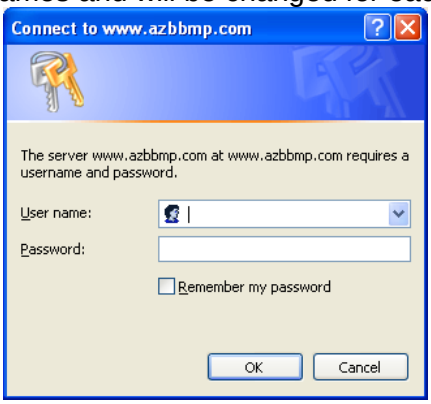
The Arizona Broadband Provider Services Portal was exclusively designed for Arizona Broadband Providers so that they may securely transmit and receive data throughout the life cycle of NTIA/FCC project.

To establish a secure and simple platform, an HTTPS web interface is coupled with unique credentials (username/password) for each broadband provider. There is no need to download any software to use the platform. It will work on any Internet browser, including; Internet Explorer, Safari, Firefox and Chrome.

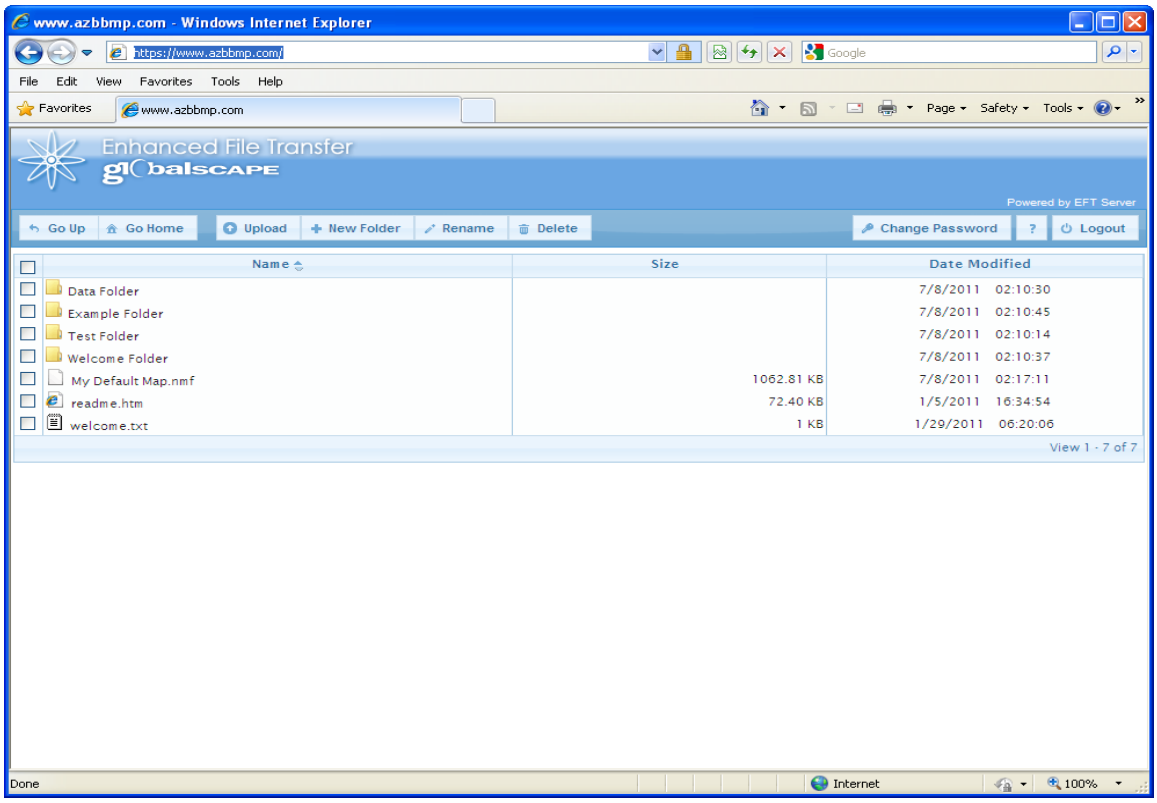
Once a provider has received their username and password, they can reach the portal via https://www.azbbmp.com/ and sign in to their secure account.



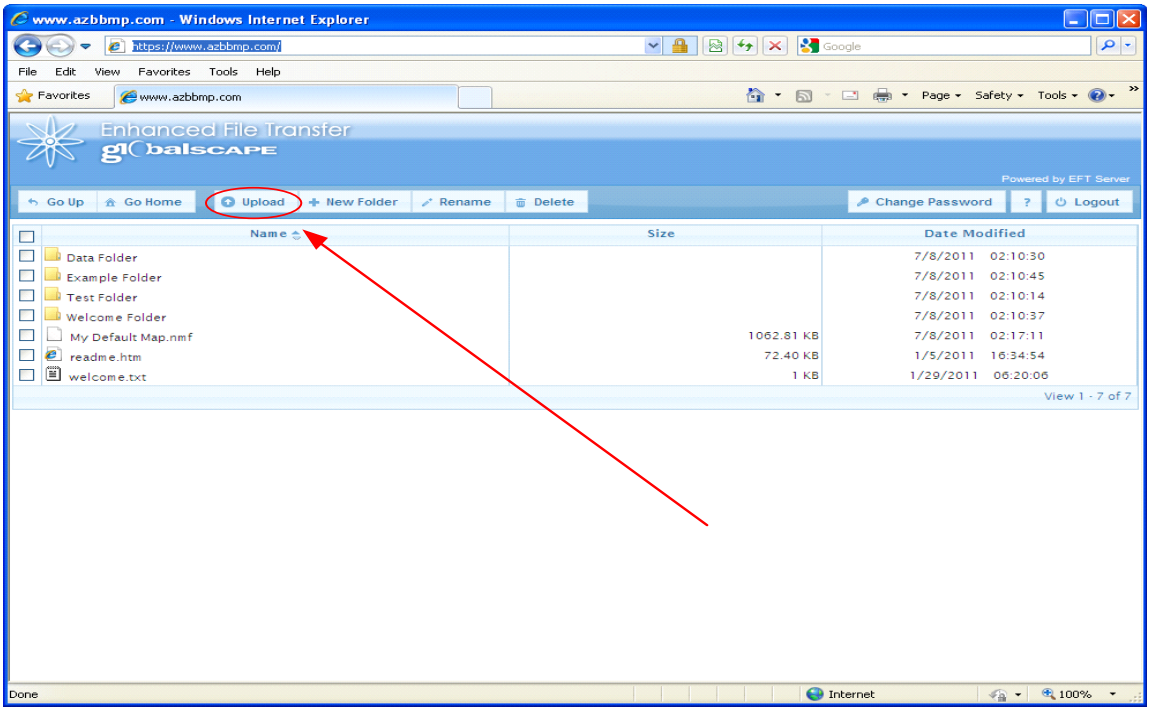
The user will be prompted for their unique credentials to enter the portal. Credentials will only be active during upload and verification timeframes and will be changed for each submittal cycle.



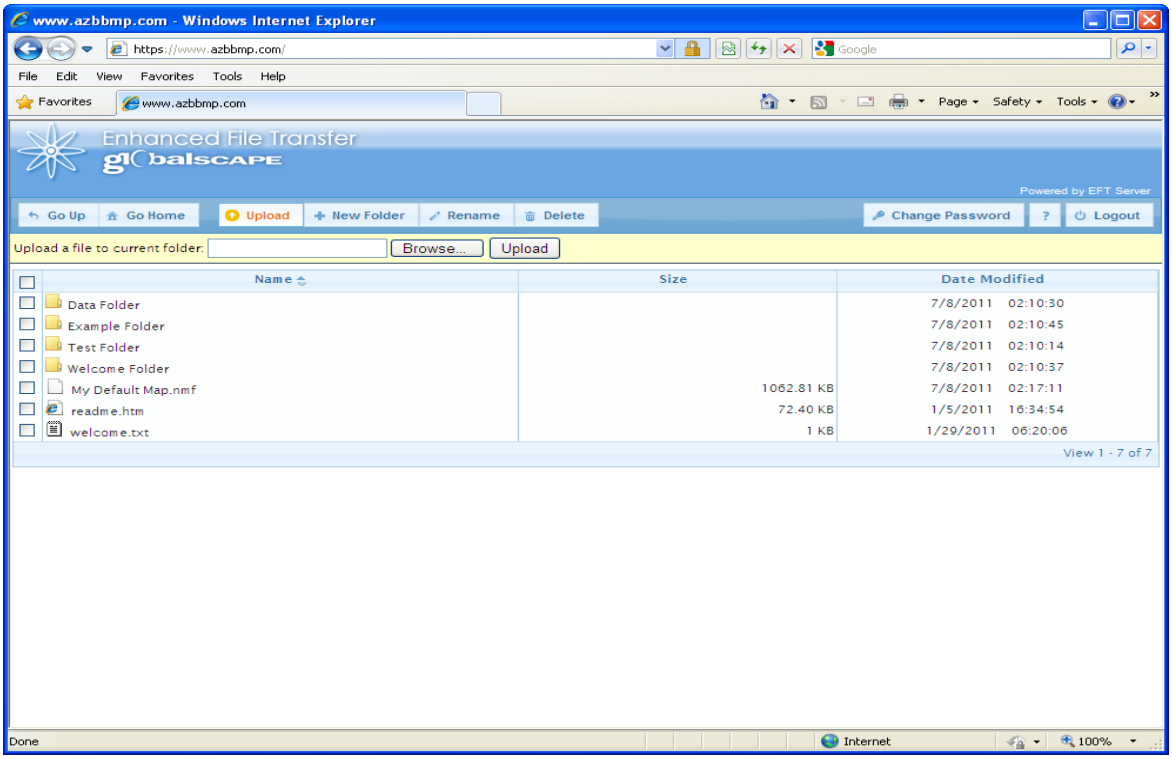
The portal interface enables the end-user upload files from their PC to the server.



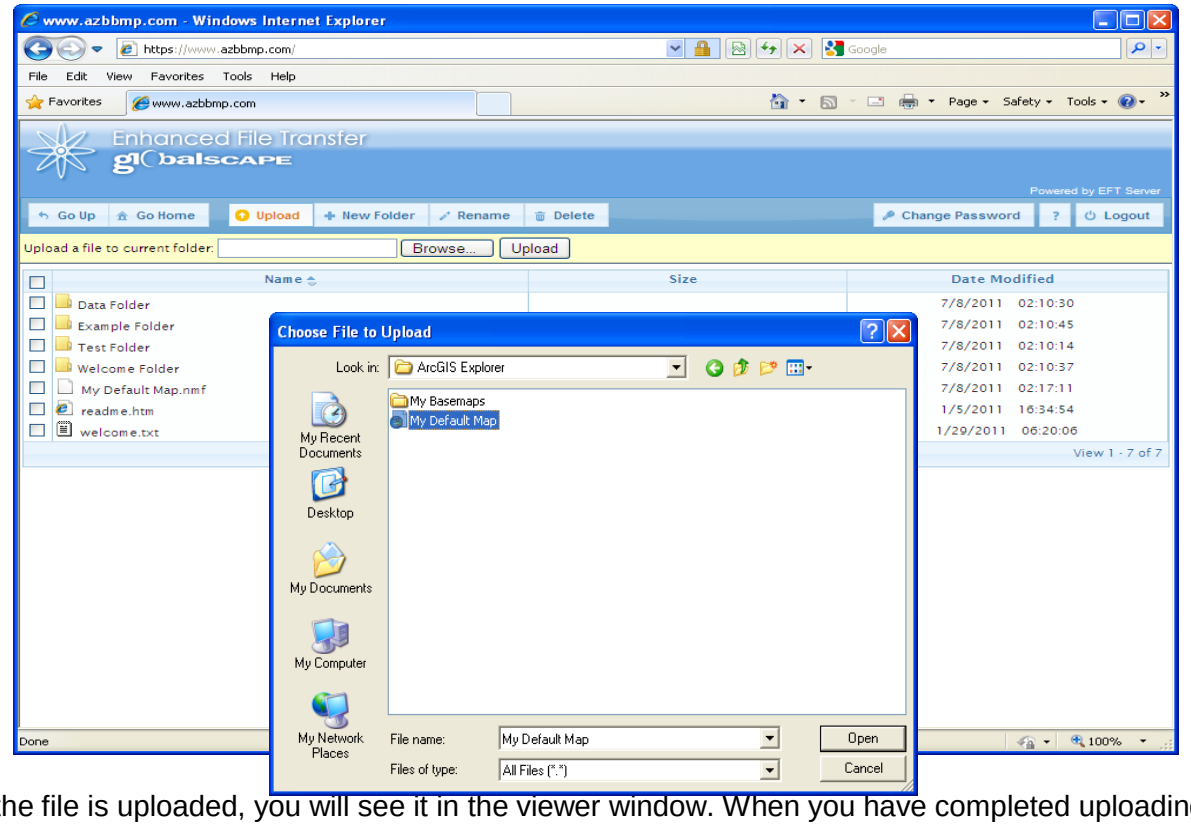
To upload files click the “Upload” button at the top of the page.



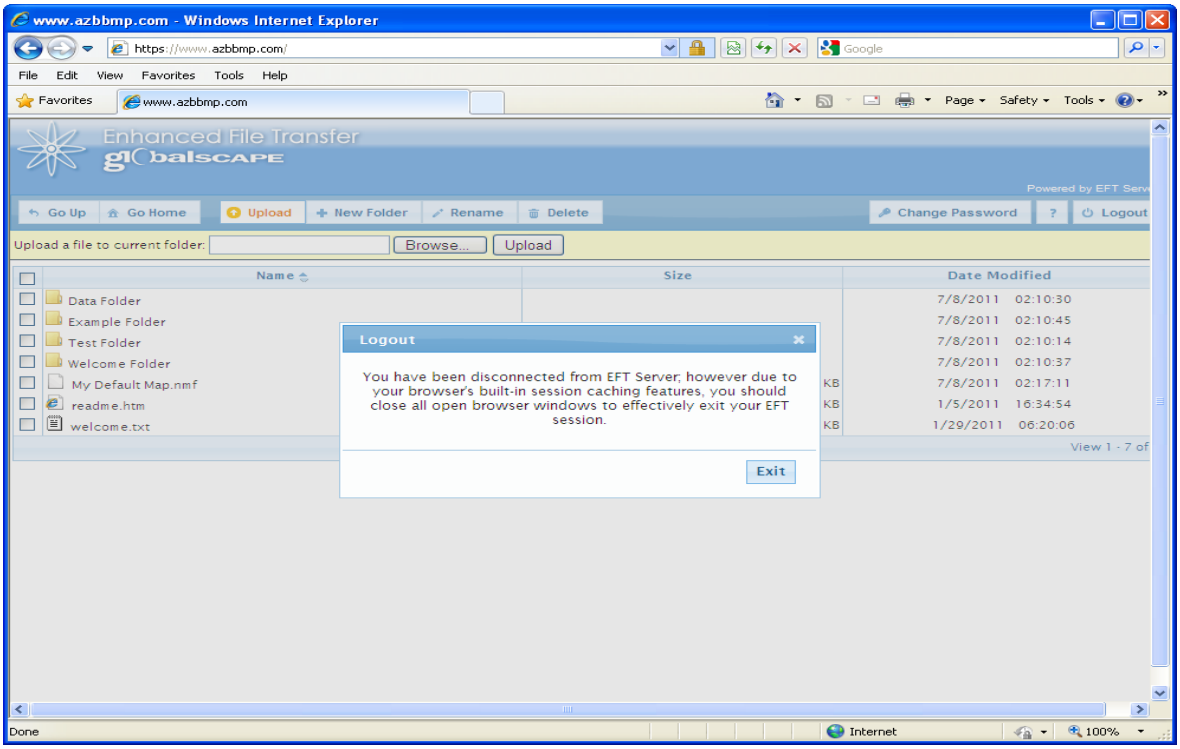
After clicking “Upload” a yellow bar with a field appears below the “Upload” button. Click “Browse” to choose a file from your computer to upload.



Choose your file to upload and click “Open”



Once the file is uploaded, you will see it in the viewer window. When you have completed uploading all of your documents, click “Log Out” in the upper right hand corner.



You have successfully completed your file upload. Thank you.

After the files have been successfully uploaded, the user credentials will be deactivated and the files will be transferred to an off-net, secure and encrypted Network Attached Storage device.

Support

Please direct any questions regarding this document, in its entirety, to:

Nolan Straabe, Data Site Consortium, Inc. (DSCI)
E-mail: nolan@straabe.com, Mobile: 602-999-0143