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# Georgia Broadband Mapping Project: Product Release White Paper

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## OVERVIEW

This white paper highlights the **Submission Summary** for this deliverable, as well as describes the **Data Gathering**, **Data Integration**, **Data Validation and Verification** and **Quality Control** processes used to create the Broadband Mapping Project's October 1<sup>st</sup>, 2012 data submission. To support varying levels of technical and program knowledge, both a **high-level summary** and a **detailed process review** are supplied.

## SUBMISSION SUMMARY

### PROVIDER DETAILS

#### PROVIDER PARTICIPATION

- Provider Participation Statistics Summary

| Summary  | Count |
|--|-------|
| Total Providers Researched/Contacted                       | 152   |
| Total Valid Broadband Providers                            | 107   |
| Non-Responsive/Researching Providers                       | 30    |
| Non-Cooperative Providers                                  | 6     |
| Number of DBAs – Represented in Data Submission            | 83    |
| Number of Providers - Supplied Updates for this Submission | 51    |
| Number of Providers - Confirmed No Updates                 | 13    |

- New Providers Since Last Data Submission
  - City of LaGrange (TT-50)
- Existing Providers – Confirmed No Updates
  - Bulldog Cable Georgia, LLC
  - Cogent Communications Inc.
  - Hargray
  - Hughes Network Systems
  - Nextlink Wireless Inc.
  - SGRITA
  - Shentel Converged Services, Inc.
  - Skycasters
  - StarBand Communications Inc.
  - Unite Private Networks, LLC
  - WildBlue Communications Inc. (ViaSat, Inc.)



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- Windstream
- XO Communications Services Inc.

- Providers that Supplied Coverage Updates

|                                   |
|-----------------------------------|
| Advanced Technology Group         |
| AL-GA Wireless Broadband LLC      |
| AllTel                            |
| AT&T Georgia                      |
| ATC                               |
| Brantley Telephone Inc.           |
| Bright House Networks LLC         |
| CenturyLink                       |
| Charter Communications Inc.       |
| Chickamauga Telephone Corporation |
| Citizens                          |
| City of Cairo                     |
| CITY OF CAMILLA                   |
| City of Dublin                    |
| City of LaGrange                  |
| MonroeAccess.net (City of Monroe) |
| City of Moultrie                  |
| CITY OF THOMASVILLE               |
| Clearwire                         |
| Comcast                           |
| ComSouth                          |
| Covad Communications Company      |
| Cox Communications                |
| Cricket Communications Inc.       |
| Darien Telephone Company Inc.     |
| DeltaCom Inc.                     |

|  |
|--|
| ETC Communications LLC                   |
| FairPoint Communications                 |
| Flint Cable Television                   |
| Frontier Communications of Fairmount LLC |
| Frontier Communications of Georgia LLC   |
| Hart Telephone Company                   |
| Kings Bay Communications                 |
| Knology of Georgia Inc                   |
| MainStreet Broadband                     |
| Pembroke Telephone Company Inc           |
| Pineland Telephone Company Inc.          |
| Plant Telephone Company                  |
| Planters Rural Telephone Cooperative     |
| Progressive Rural Telephone              |
| Ringgold Telephone Company               |
| Southeastern Services Inc.               |
| Sprint                                   |
| SyncGlobal                               |
| TDS Telecom                              |
| T-Mobile                                 |
| tw telecom of georgia l.p.               |
| Verizon Wireless                         |
| Waverly Hall Telephone LLC               |
| Wilkes Telephone and Electric Co.        |
| Zayo                                     |

- Non-Responsive/Research Providers

|   |
|---|
| Airimba and Windchannel Communications            |
| Albany Water Gas & Light                          |
| Blue Ridge Mountain EMC                           |
| Broadstar, LLC                                    |
| Bulloch County Rural Telephone Cooperative Inc.   |
| City of Augusta                                   |
| City of Cartersville- FiberCom                    |
| City of Milledgeville                             |
| City of Statesboro                                |
| Columbia County Information Technology Department |
| Communicom  |
| Dalton Utilities                                  |
| DirectPath  |
| Georgia Business Net                              |
| Georgia Public Web, Inc.                          |

|  |
|--|
| Gosuto Wireless Internet                                 |
| Habersham Electric Membership Corporation                |
| KitePilot Wireless Internet                              |
| MediaStream  |
| MetroPCS Georgia, LLC                                    |
| North Georgia Network Cooperative, Inc                   |
| One Ring Networks  |
| Parker Fibernet  |
| Peachnet   |
| Plantation Cablevision, Inc.                             |
| Quitman Wireless   |
| Talk America Inc   |
| University Corporation for Advanced Internet Development |
| VectorLink   |
| Wave2Wave Communications                                 |





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- Non-Cooperative Providers
  - Birch Communications, Inc.
  - Birch Telecom of the South, Inc
  - Brightlan.net
  - Kennedy CableVision Inc.
  - NuLink Digital
  - Smartresort Co, LLC dba Beyond Communications
- Providers researched and identified as non-broadband providers can be viewed within the table at the end of this document.

### **COVERAGE AREA CHANGES**

- Coverage Footprint Reductions/Map Refinement - Resulting from Validation (Provider Portal)
  - CenturyLink (TT-10)
  - Comcast (TT-41)
  - ComSouth (TT-10)
  - Cox Communications (TT-40)
  - Darien Communications, Inc. (TT-50)
  - Frontier Communications of Fairmount, LLC (TT-10)
  - TW Telecom of Georgia l.p. (TT-10)
- Coverage Footprint Expansion –
  - AT&T Georgia (TT-10)
  - AT&T Georgia (TT-50)
  - Charter Communications Inc. (TT-40)
  - Comcast (TT-40)
  - FairPoint Communications (TT-10)
  - Frontier Communications of Georgia, LLC (TT-10)
  - Main Street Broadband (TT-71)
  - Pembroke Telephone Company, Inc (TT-50)
  - TDS Telecom (TT-10)
  - TW Telecom of Georgia l.p. (TT-50)
  - ViaSat (TT-60)
  - Zayo Group LLC (TT-50)
- Provider Attribute/Name/TT Changes –
  - New Edge Networks, Inc. (TT-10/TT-20/TT-30/TT-41 Removed / Non-Cooperative)
  - WildBlue Communications, Inc. (TT-60, Changed Name to ViaSat)
  - AboveNet Communications Inc (TT-50 Removed / Sold to Zayo)



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## COMMUNITY ANCHOR INSTITUTION (CAI) DETAILS

### OVERALL STATISTICS

| Community Anchor Institution - Categories | Overall Count | CAIID Counts | Broadband Subscriber | Trans Tech  | Advertised Speed Down | Advertised Speed Up |
|---|---------------|--------------|----------------------|-------------|-----------------------|---------------------|
| Category 1 - School K through 12          | 2087          | 2037         | 2077                 | 2077        | 2077                  | 2077                |
| Category 2 - Library                      | 451           | 368          | 383                  | 383         | 382                   | 382                 |
| Category 3 - Medical/Healthcare           | 2633          | 0            | 0                    | 0           | 0                     | 0                   |
| Category 4 - Public Safety                | 2656          | 0            | 0                    | 0           | 0                     | 0                   |
| Category 5 - Universities/Colleges        | 202           | 110          | 99                   | 99          | 99                    | 99                  |
| Category 6 - Other: Government            | 747           | 0            | 0                    | 0           | 0                     | 0                   |
| Category 7 - Other: Non-Government        | 0             | 0            | 0                    | 0           | 0                     | 0                   |
| <b>Total</b>                              | <b>8776</b>   | <b>2515</b>  | <b>2559</b>          | <b>2559</b> | <b>2558</b>           | <b>2558</b>         |

### CAI CHANGES

- Increase in the data collected for Category 1 – Schools K through 12.
- We will be focusing on collecting broadband information for Category 3 – Healthcare and identifying what information can be gathered for Categories 4 and 6 to create a more complete inventory.
- The CAI inventory was review again against the database mentioned below for the following categories: Category 1: K-12 Schools, Category 2: Libraries and Category 5: Colleges  
These databases are as follows:
  - For K-12 institutions (CAI type 1) please add the NCES ID CCD ID value found here:  
<http://nces.ed.gov/ccd/bat/>
  - For Higher Education (CAI type 5) please add the NCES IPEDS ID value found here:  
<http://nces.ed.gov/ipeds/datacenter/>
  - For Libraries (CAI type 2) please. Combine (do not add) "FSCSKey" and "FSCs\_SEQ" from the "puout08av2000" file and place them here:  
<http://harvester.census.gov/imls/data/pls/index.asp> (FYI the LIBID is your state's unique ID for libraries)



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## ***SUBMISSION RECEIPT***

### ***SUBMISSION RECEIPT RESULTS***

- Attached are the results from the NTIA data submission receipt quality script.



GA\_2012\_9\_27.txt

- Error Report
  - The main items flagged within the submission receipt were the technology and speed matches, which were validated by the provider and/or are within the ranges communicated in the NTIA data model.
  - All items are included within the accompanying ReadMe file.



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## HIGH-LEVEL SUMMARY

### DATA GATHERING

#### BROADBAND SERVICE AREAS, MIDDLE MILE AGGREGATION POINTS AND BROADBAND SERVICE OVERVIEW

The collection of Broadband Service Areas, Middle Mile Aggregation Points and Broadband Service Overview information is handled through the following Provider Outreach Process:

- Build and maintain an inventory of Broadband providers through currently known providers and research.
- The inventory and everyday interaction with providers is tracked using the Provider Catalog (PCat). Below are some examples of the web application, which has a shared access between our team and mapping partner (BroadMap).

| Company Information     |                                     | Edit                           | Clone                                 | History | AAD   |
|-------------------------|-------------------------------------|--------------------------------|---------------------------------------|---------|-------|
| Provider Name           | acmetech (All)                      | Source Name                    | acmetech                              |         |       |
| Company Address         |                                     | Source Description             |                                       |         |       |
| Company PO Box          |                                     | Layer Name                     | TBD                                   |         |       |
| Company House Number    | 12345                               | Source Usage Type              | Tracking                              |         |       |
| Company Street Name     | Acme Avenue                         | Source Provider Type           | BroadMap                              |         |       |
| Company City Name       | Portland                            | Source Content Type            |                                       |         |       |
| Company Suite           |                                     | Source Restrictions            | <input type="checkbox"/>              |         |       |
| Company Postal Boundary |                                     | Source Restriction Description |                                       |         |       |
| Company State           |                                     | TT Types                       | --None--                              |         |       |
| Company Website         | http://www.acmebroadband.com        |                                | Asymmetric xDSL                       |         |       |
| Source ID               | 4999                                |                                | Symmetric xDSL                        |         |       |
| Child Source            | <input type="checkbox"/>            |                                | Other Copper Wireline                 |         |       |
| Parent URL              |                                     |                                | Cable Modem-DOCSIS 3.0                |         |       |
| Parent Source ID        | 0                                   |                                | Cable Modem-Other                     |         |       |
| User Name               |                                     |                                | Optical Carrier/Fiber to the End User |         |       |
| Password                |                                     |                                | Satellite                             |         |       |
| Form 477 Interest       | <input type="checkbox"/>            | Addr Level Data Provided       | <input type="checkbox"/>              |         |       |
| Provider Portal Trained | <input checked="" type="checkbox"/> | Preferred Contact Method       |                                       |         |       |
| <b>Contacts</b>         |                                     |                                |                                       |         |       |
| Type                    | Name                                | Preferred                      | Phone 1                               | Phone 2 | Email |
| P                       | Sourcing                            |                                |                                       |         |       |
| <b>FRN Info</b>         |                                     |                                |                                       |         |       |
| Provider Name           | DBA                                 | FRN Number                     |                                       |         |       |



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| Confidence                      |                          |               |         | New   |
|---------------------------------|--------------------------|---------------|---------|---|
| TT Type                         | Confidence               | Last Modified | Comment |   |
| <b>Status Tracking</b>          |                          |               |         |   |
| Non Facilities Based Provider   | <input type="checkbox"/> |               |         |   |
| Business Only Provider          | <input type="checkbox"/> |               |         |   |
| Reseller                        | <input type="checkbox"/> |               |         |   |
| NDA Review - Internal           | <input type="checkbox"/> |               |         | Non Responsive Provider <input type="checkbox"/>  |
| NDA Review - External           | <input type="checkbox"/> |               |         | Non Cooperative Provider <input type="checkbox"/> |
|                                 |                          |               |         | Source Closed <input type="checkbox"/>            |
| <b>Service Provider Details</b> |                          |               |         |   |
| BroadMapper                     | --None--                 |               |         | BroadMap Status Unassigned                        |
| Initial State Outreach Date     |                          |               |         | Initial Contact Vehicle                           |
| Provider Origin                 |                          |               |         | Member Association                                |
|                                 |                          |               |         | Initial State Outreach <input type="checkbox"/>   |
|                                 |                          |               |         | NDA Status --None--                               |
|                                 |                          |               |         | NDA Not Required <input type="checkbox"/>         |
|                                 |                          |               |         | NDA Requested <input type="checkbox"/>            |
|                                 |                          |               |         | NDA Exchanged <input type="checkbox"/>            |
| Provider Packet Exchanged       | <input type="checkbox"/> |               |         | NDA Exchange Date                                 |
| Provider Packet Info Sent       |                          |               |         | NDA Signed <input type="checkbox"/>               |
| Provider Meeting Status         | --None--                 |               |         | NDA Signed Date                                   |
| Technical Meeting Requested     | <input type="checkbox"/> |               |         |   |
| Technical Meeting Scheduled     | <input type="checkbox"/> |               |         |   |
| Number of Subscribers           |                          |               |         |   |
|                                 |                          |               |         | Date Loaded                                       |
|                                 |                          |               |         | Source Closed Date                                |

| BDIA Delivery 0412     |                              | Edit  |
|------------------------|------------------------------|---|
| Status                 | --None--                     | Provider Data Reviewed <input type="checkbox"/> |
| Outreach Date          |                              | Provider Data Reviewed Date                     |
| Initial Response       |                              | FootPrint                                       |
| Meeting Date           |                              | MiddleMile                                      |
| No Update Date         |                              | Subscriber                                      |
| Waiting For Data Date  |                              | Provider Login <input type="checkbox"/>         |
| Data Received Date     |                              | Provider Login Date                             |
| Data Accepted Date     |                              |   |
| Source Ingested        |                              | Source Ingested Date                            |
| <b>Additional Data</b> |                              |   |
| Notes                  |                              |   |
| Next Steps             |                              |   |
| Inactive               | <input type="checkbox"/>     | Owner briordan                                  |
| Created By             | briordan 2011-06-13 12:06:35 | Last Modified By krousseau 2012-03-16 13:41:58  |

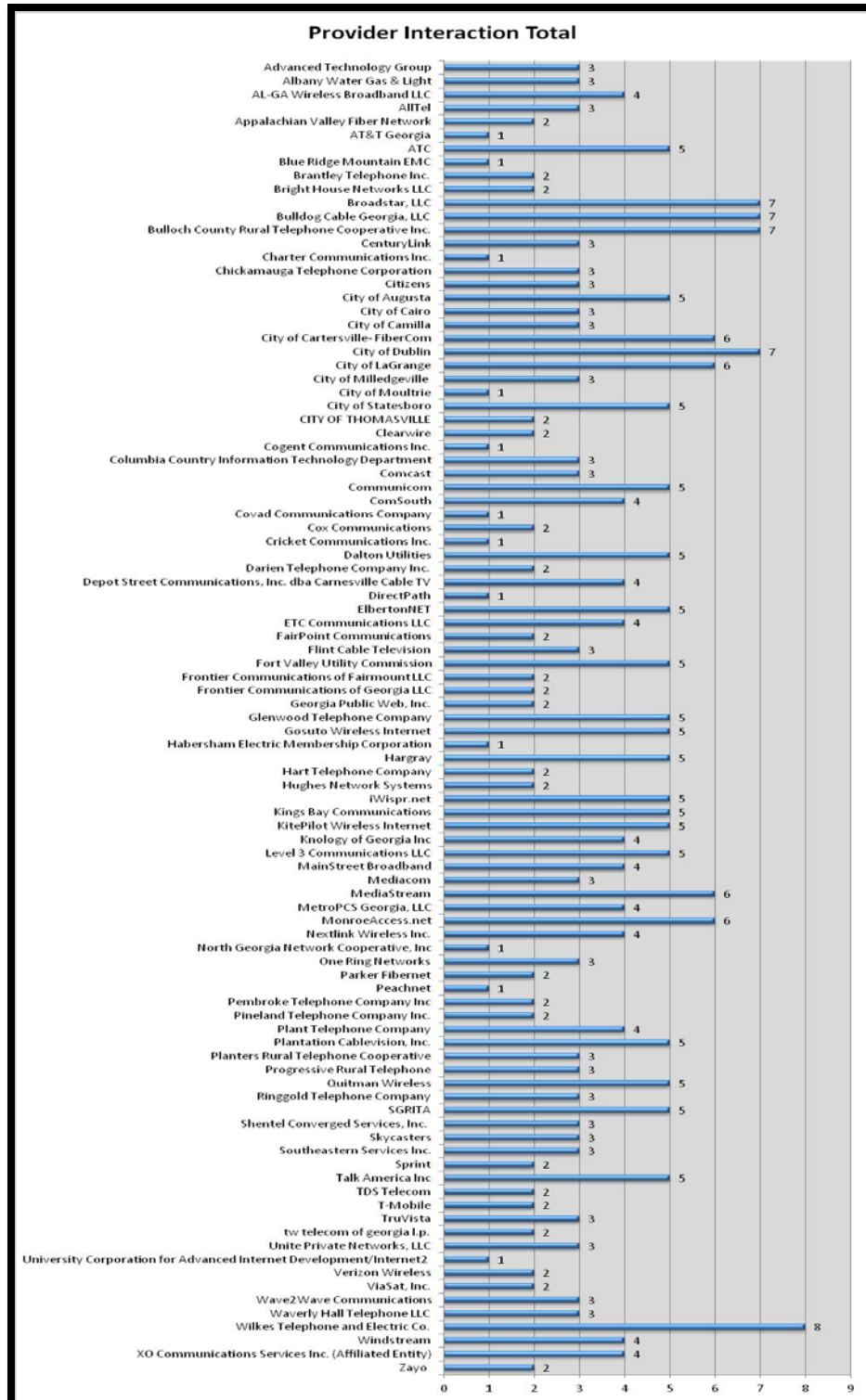


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- In order to encourage participation throughout the life of the program, we feel it's important to foster relationships with the providers and encourage a collaborative team effort between all parties for each data submission. The chart below represents that interaction count with each provider.





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- Update provider material that describes the data requirements and logistics for data transfer.
- Update Non-Disclosure Agreement (NDA) for use in the project, where applicable.
- Maintain multiple protocols for the provider to submit data, including Secure File Transfer Protocol (SFTP) technology when desired.
- Conduct one-on-one informational discussions with each provider to communicate the following:
  - Requirements of this project;
  - Broadband data required to support the product data model;
  - Submission protocols available;
  - Capability to validate how the supplied data is aggregated.
- Download/receive provider data.
- Establish a repeatable process with provider. Maintain provider communication, transaction and data handling records throughout the project (dates contacted, data received, etc.).

### ***COMMUNITY ANCHOR INSTITUTION (CAI)***

The collection of CAI information is handled through the following CAI Collection Process:

- Collect and maintain inventory of CAIs through currently known CAIs, data mining, and research.
- Maintain web-based CAI portal for institutions to add or confirm attribution, location and enter broadband-specific information.
- Upload web-based data to Core Database for standardization.
- Perform internal cleansing, such as removing duplicate records, identifying gaps in broadband attribution and verifying category.
- Geocode CAI locations.
- Translate Core Database data to deliverable-ready format.
- Continue engagement with non-responsive institutions.





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## DATA INTEGRATION PROCESS

The data integration and processing mechanisms currently used allows for multiple types of inputs and result in a standardized output that meets the NTIA deliverable requirements. This flexible process supports data model changes and project-requested enhancements.

- Receive inputs from providers via submission protocols; upload into Sourcing Database and catalog with provider information.
- Review provider-supplied data for completeness and for potential discrepancies that require resolution prior to processing and flag as necessary.
- Categorize input into data-type category (addresses, block lists, paper maps, etc.).
- Standardize input based on data type within Staging Database.
- Create Compact Polygons (CP)—(internal methodology for generating area-based feature for coverage in Staging Database).
- Apply broadband attribution to CP; apply metadata to CP.
- Perform quality analysis of the CP against the source supplied to identify any completeness or accuracy issues.
- Request additional information from the provider if elements of coverage are missing or contain discrepancies. This is a second manual quality check to ensure data is complete.
  - Process coverage area to build the required NTIA data model layers.

With the deployment of the Provider Portal this round, the data collection and later validation process was streamlined allowing both activities to occur within a secure web application. The majority of the providers used this methodology as it supplies them with more visibility into how their data is being represented and gives them knowledge and ownership of their coverage representation. Below are some bullet points and supporting screen shots on how the portal is used.

- Each provider is assigned credentials with a strong password to ensure security measures are taken into consideration

- Collection and confirmation our contact, as well as the company's DBA Name and FRN accuracy



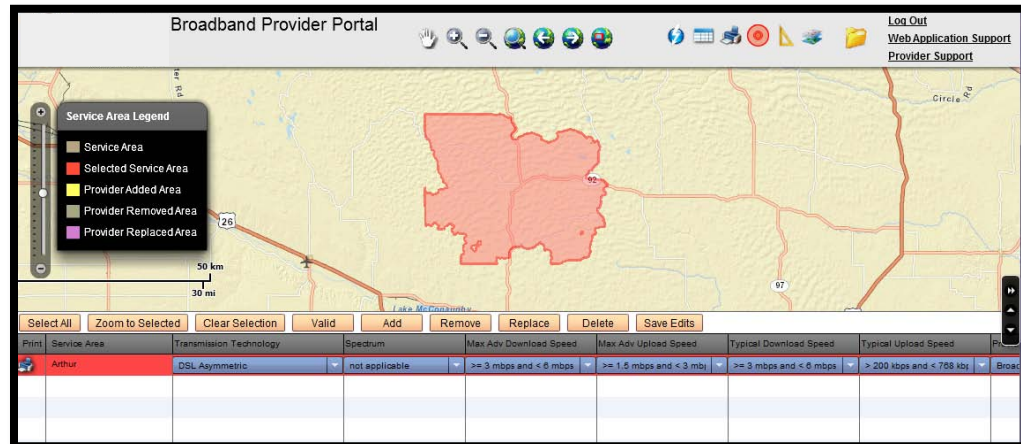


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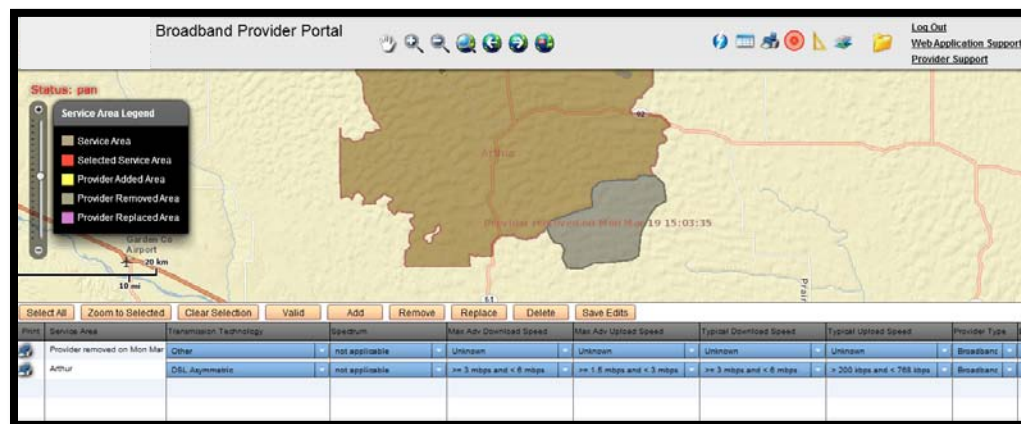


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- Capability to review and request changes to the coverage footprint



- The provider can Add/Remove portions, or all, of the footprint requesting that their footprint be increased or refined.





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- Middle Mile and Average Weight Nominal Speed (AWNS) collection and validation

**Broadband Provider Portal**

Status: Click to select pushpin

**Service Area Legend**

- Service Area
- Selected Service Area
- Provider Added Area
- Provider Removed Area
- Provider Replaced Area

**Middle Mile Information Editor**

Ownership:    
Back-haul Capacity:    
Back-haul Type:    
Elevation (feet):    
State Location:   
Location Valid:

**Display Information**

Display Middle-Mile information by hovering over the Middle-Mile location with the cursor.

**Edit Information**

Edit Middle-Mile information by clicking on the Middle-Mile location.

**Validate Information**

**Add Middle-Mile location on map:**

Select Find Address or Pushpin Location

☐ Find Address ☐ Pushpin Location

| Prov   | Service Area | Transmission Technology | Speed          | Max Adm Download Speed | Max Adm Upload Speed     | Typical Download Speed |
|--------|--------------|-------------------------|----------------|------------------------|--------------------------|------------------------|
| Arthur |              | DSL Asymmetric          | not applicable | <= 3 mbps and < 6 mbps | <= 1.5 mbps and < 3 mbps | <= 3 mbps and < 6 mbps |

**AWNS**

**AWNS Settings for 'DSL Symmetric' in Arthur County**

Change the advertised download speeds and/or change the number of subscribers and click 'Calculate AWNS'

Advertised Download kbps #1:  # of Subscribers:

Advertised Download kbps #2:  # of Subscribers:

Advertised Download kbps #3:  # of Subscribers:

Advertised Download kbps #4:  # of Subscribers:

Advertised Download kbps #5:  # of Subscribers:

AWNS in kbps:

- File upload functionality to support providers that would prefer a shapefile, spreadsheet, PDF, KMZ/KML file be used to reflect changes for the data round



Welcome

1 Choose a file to upload:    (50MB max)

\*Uploading a new file with the same name as an existing file will overwrite the existing file

Uploaded Files

2 Please click here to auto-notify BroadMap of your uploads, thanks.

3 Logout

- Once the provider has review completed changes to their coverage, middle mile and AWNS, then can validate them all by signing off that everything is accurate.



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## DATA VALIDATION AND VERIFICATION

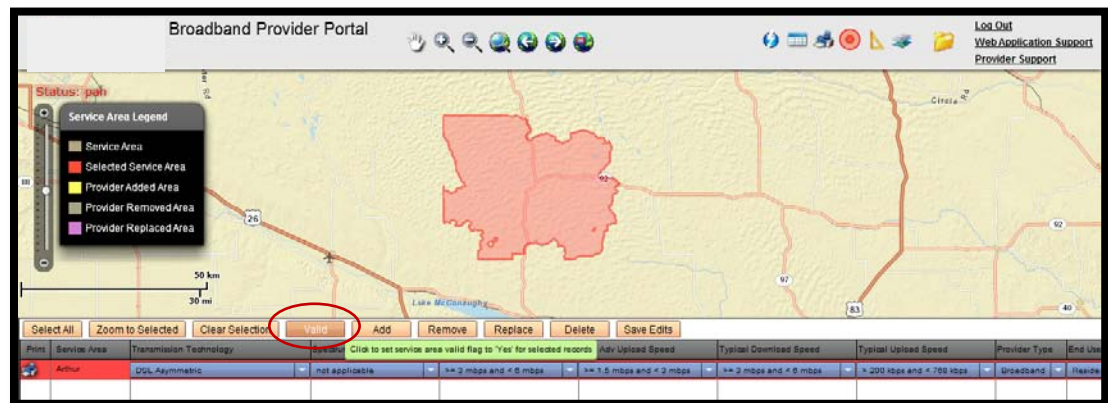
Following the creation of the product, process steps within Data Validation and Verification occur. To ensure the data collected and processed is as accurate and comprehensive as possible, provider validation and internal verification activities are employed. After the initial mapping of providers' coverage areas and serviceability claims, additional reviews are performed using the methods described in the subsections below in order of action (**Broadband Provider Validation, SME Verification, Public Verification, Third-Party Data Verification and Confidence Values**).

### BROADBAND PROVIDER VALIDATION—PROVIDER PORTAL APPLICATION

Providers are trained on and requested to use a secure interactive web application to review their current coverage area(s) and supporting broadband attribution and validate their data or submit change requests to update their data. All provider change requests go through the **Data Integration Process** and are reviewed with the provider to complete validation.

With the latest released of the Provider Portal, validation on the coverage area, middle mile and average could be completed individually. Validation examples are as follows:

- Coverage validation can be done on one record/footprint at a time or by selecting footprints and selecting the 'Valid' button. The provider could also print off or download their coverage for their own tracking purposes.



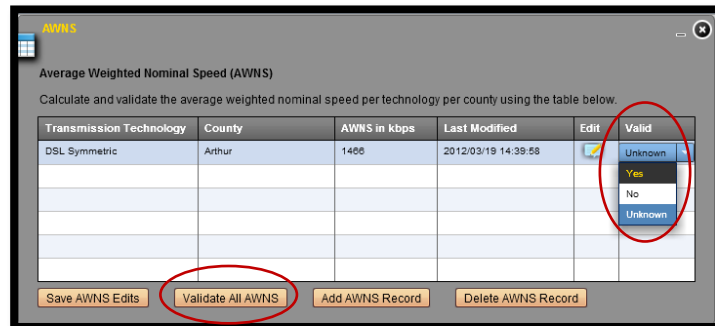
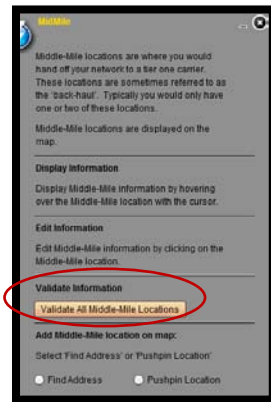


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- Middle Mile & AWNS Validation



All validation results are tracked internally through our Validation Table, which also improves the overall **Confidence Value** as mentioned below.

## **SME VERIFICATION – PROVIDER PORTAL ADMIN**

For this dataset submission, Georgia introduced new verification enhancements to the Provider Portal that supports administrative functionality for Subject Matter Experts (SMEs) to review the provider coverage areas and supply feedback/commentary on the accuracy and completeness. These enhancements allowed Georgia to:

- Review the coverage submitted by the carriers online
- Use our subject matter expertise to evaluate the accuracy of the data against local knowledge, online advertising, personal meetings, etc.
- Document a dialogue with its providers for verification purposes. We were able to review many of the provider submissions manually and submit questions to the providers if speeds, coverage areas, technology types, or other items appeared.
- Update provider entries if appropriate.
- Report our verification comments and any responses from the providers to NTIA in the dataset.

**NOTE:** Georgia analyzed every carrier who did not meet the NTIA Technology/Speed table matches and documented our justification, submitted question/commentary to the carrier, or corrected the carrier's entry. All commentary extracted from the administrative portal can be found with the data package that accompanied this data submission.

Below are some screen shots illustrating the administrative capability of the Provider Portal.

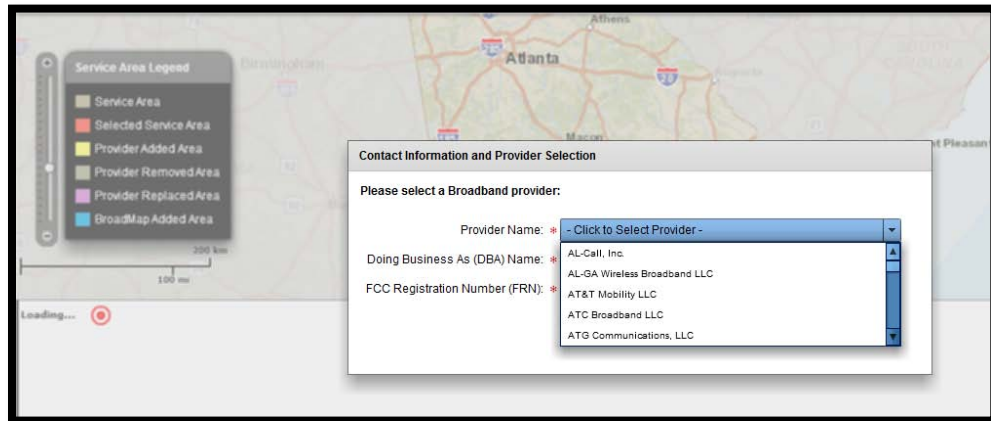


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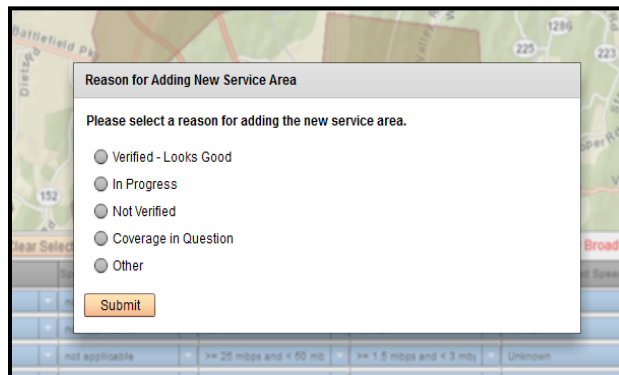


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As shown below, the SME can login through the secure web application and choose the provider to be reviewed.



The portal supports two ways of verification at a coverage footprint level. The SME can draw areas of concern or approval on the map and supply a categorized comment that can easily be extracted at anytime.



Additionally, the SME can leave commentary that will then be automatically e-mailed to the provider for their review and displayed as a pop-up when the first login to the Provider Portal. This includes historical tracking so you can see all commentary between the SME and provider, as well as the date/time stamp for each comment.

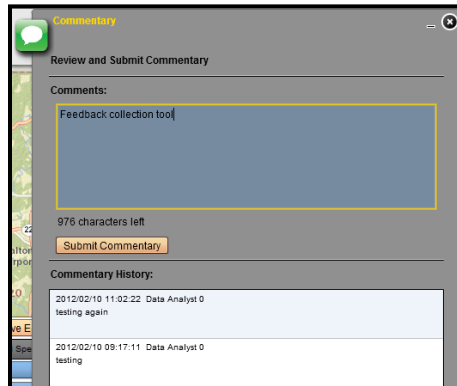




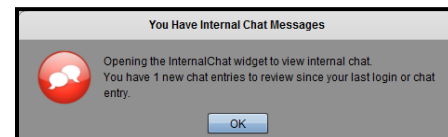
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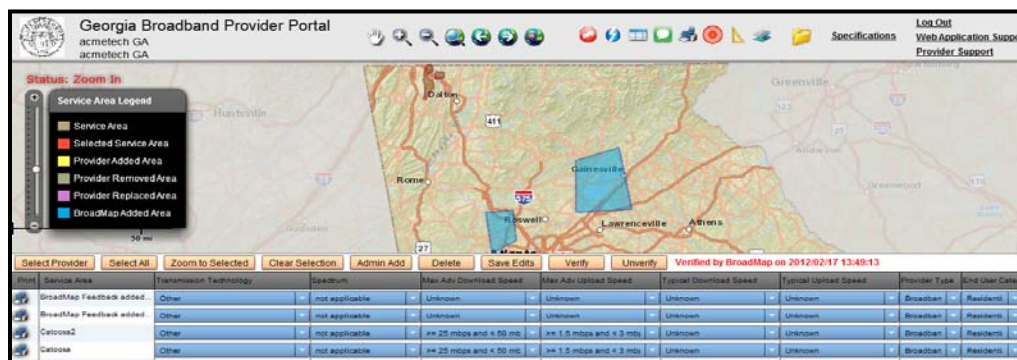
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The administrative Provider Portal also allows for commentary between team members, which will only be viewable by the internal admin team members. The team members are notified automatically via e-mail when a comment is submitted, as well as when they login.



Similar to how the providers update and validate their coverage within the Provider Portal, the administrative version walks the SME through the verification assignments to ensure everything is reviewed and documented with a status and date/time stamp.



Through the testing and initial release of the portal, the providers have been very responsive to the commentary and supplying updates where needed. As we progress with this tool, the commentary and verification status will be included in future submission documentation. Some is already included within this submission's data package.



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## **CROWD SOURCING**

The collection and use of public feedback on provider coverage areas is planned for deployment soon after the spring data submission. An updated version of the State public interactive map will be released with enhanced feedback capability, which can then be brought to the provider for potential map refinement.

## **THIRD PARTY DATA VERIFICATION**

We are currently in the process of acquiring 3<sup>rd</sup> party data to extend our verification efforts. The data that will be acquired will allow comparisons against exchange and cable boundaries. We will also continue our reviews against the Form 477 data as provider coverage areas change from submission-to-submission.

## **CONFIDENCE VALUES**

All verification, validation and manual quality review results are tracked by provider/technology type and stored and maintained within a **Validation table**. A confidence value is assigned, based on internal assessments of the collected information, to highlight the provider coverage areas and/or attributions that would benefit from further investigation and/or enhancements.

With the continued efforts on provider validation, 3<sup>rd</sup> party verification and the release of the public interactive map with feedback collection functionality, the confidence values will be utilized further to identify specific areas in need of attention. We're currently at the initial stages of this initiative, but will have a more complete picture in time for the next data submission.

## **QUALITY CONTROL**

Following collection, processing and analysis of the provider and CAI data, the product is checked manually and algorithmically against the NTIA data model. Some of the items included within these checks are:

- Format correctness;
- Table and field structure;
- Valid values, including default values, where applicable;
- Geographic extent and topology errors.

Prior to data submission, another quality control script supplied by NTIA is run. This script, SBDD\_CheckSubmission.py, creates an output in text form that is required to be submitted along with the final deliverable. All errors must come up clean, unless otherwise specified by NTIA.



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## DETAILED PROCESS REVIEW

To review the detailed process, please review the attached object:



BMap\_ProcessDetails  
\_2012\_10\_01.docx

## PROVIDERS RESEARCHED

Below is a list of providers that were researched and contacted, but identified as non-broadband providers and didn't require inclusion within the data submission. Some may be due to different naming conventions or inaccurate FRN/DBA names and were therefore considered a closed source.

|   |   |   |
|---|---|---|
| SLINX Enterprises, Inc.                 | Dialtone & More, Inc                      | OneTone Telecom, Inc.                           |
| 8x8, Inc.                               | Digital Agent, LLC                        | ONS-Telecom, LLC                                |
| Access One, Inc.                        | DoveTel Communications, LLC               | OnWav, Inc                                      |
| Access Point, Inc.                      | DOW Management Company, Inc.              | PaeTec Corporation                              |
| Accessline Holdings, Inc.               | DSLnet Communications LLC                 | Peerless Network, LLC                           |
| ACN, Inc.                               | Echostar                                  | Phone.com, LLC                                  |
| ACN, Inc.                               | ECR Voice, LLC                            | Plant Tifnet                                    |
| Airespring, Inc.                        | Electric Power Board                      | PNG Telecommunications, Inc.                    |
| Albany State University                 | Equinox, Inc.                             | Preferred Long Distance, Inc.                   |
| Albany, Water, Gas and Light Commission | Ernest Communications, Inc.               | Professional Resources Management of Rabun, LLC |
| ALEC, Inc.                              | EveryCall Communications, Inc.            | Proximiti Technologies, Inc.                    |
| Alma Telecom, Inc.                      | Evolve IP, LLC                            | Public Service Telephone Company                |
| Alternative Phone, Inc.                 | Fidelity Voice Services LLC               | Quick Connect Telecommunications, Inc.          |
| America Internet & Communications       | Fionda VoIP, LLC                          | Quincy Telephone                                |
| American Telephone Company LLC          | First Communications, LLC                 | Qwest   |
| Appalachian Valley Fiber Network        | Global Connection Inc. of America         | Razorline LLC                                   |
| Applied Satellite Technology Systems    | Global Crossing North America, Inc.       | Reynolds Cable TV Inc.                          |
| Apptix, Inc.                            | GlobalPhone Corp.                         | Ring Connection, Inc.                           |
| Aptela, Inc.                            | Granite Telecommunications, LLC           | Saturn Telecommunication Services Inc.          |
| AT&T Mobility LLC                       | GreatCall, Inc.                           | Seimitsu Corporation                            |
| Atlantic Tele-Network                   | Hickory Tech Corporation                  | Semperon Corporation                            |
| Avaya Inc.                              | iCore Networks, Inc.                      | Single Source Integrated Services, Inc.         |
| Bandwidth.com, Inc.                     | IDT Corporation                           | SinglePipe Communications                       |
| BCN Telecom, Inc.                       | InPhonex.com, LLC                         | South Carolina Net, Inc.                        |
| BetterWorld Telecom, LLC                | Interface Security Systems Holdings, Inc. | South Georgia Governmental Services Authority   |
| Big River Telephone, LLC                | Interglobe Communications, Inc.           | Southern Communications Services, Inc.          |
| Birch Communications Inc.               | IP Communications, LLC                    | Southern Telecom, Inc.                          |





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|  |
|--|
| Blue Ridge Mountain EMC                            |
| Blue Ridge Telephone                               |
| Board of Water, Light & Sinking Fund Commissioners |
| Broadview Networks Holdings, Inc.                  |
| Broadvox Go!, LLC                                  |
| Budget Prepay Inc.                                 |
| BullsEye Telecom, Inc.                             |
| Call Catchers, Inc.                                |
| Cause Based Commerce Inc.                          |
| Cbeyond Communications, Inc.                       |
| CCP Holdings, LLC                                  |
| Cincinnati Bell Inc.                               |
| City of Cartersville                               |
| City of Decatur                                    |
| City of Elberton, Georgia                          |
| City of Hapeville                                  |
| City of LaGrange                                   |
| City Of Manchester                                 |
| City of Manchester, Georgia                        |
| City of Savannah                                   |
| City Of Wadley                                     |
| CommPartners Holding Corporation                   |
| Computer Office Solutions, Inc.                    |
| Conexiz Corporation                                |
| ConnectMe, L.L.C.                                  |
| Corr Wireless Communications, LCC                  |
| Covista, Inc.                                      |
| Cypress Communications, Inc.                       |

|   |
|---|
| IP Networked Services, Inc.                     |
| ipSBS Managed Services, LLC                     |
| Kosmaz Technologies, LLC                        |
| LightEdge Solutions, Inc.                       |
| LightSquared LP                                 |
| LY Holdings, LLC                                |
| M5 Networks, Inc.                               |
| Matrix Telecom, inc.                            |
| Megapath  |
| MetroPCS Georgia, LLC                           |
| Metropolitan Telecommunications Holding Company |
| Midwestern Telecommunications Inc.              |
| Millicorp                                       |
| Mitel Netsolutions Inc.                         |
| Mix Networks, Inc.                              |
| MOMENTUM TELECOM INC                            |
| N.W.ComTech, Inc                                |
| Navigator Telecommunications, LLC               |
| Negia, Inc.                                     |
| Netlink IP Communications                       |
| Netlogic, Inc.                                  |
| Network Billing Systems LLC                     |
| Nexus Communications, Inc.                      |
| nexVortex, Inc.                                 |
| Northland Communications Corp.                  |
| Northwest Georgia Regional Commission           |
| NOS Communications, Inc.                        |
| Ojo Service LLC                                 |

|   |
|---|
| StarBand Communications Inc.                      |
| TCO Network, Inc.                                 |
| TDS Telecom2                                      |
| Telapex, Inc.                                     |
| Tele Circuit Network Corporation                  |
| Teledias Communications, Inc.                     |
| Telefonica USA, Inc                               |
| Telekenex, Inc.                                   |
| Telephere Networks Ltd.                           |
| Telovations, Inc.                                 |
| Tennessee Telephone Service, LLC                  |
| The Edge Group Inc                                |
| Think 12 Corporation                              |
| Thinking Phone Networks, LLC                      |
| Tphone.us   |
| Trans National Communications International, Inc. |
| Transbeam Inc.                                    |
| Trenton Telephone Co.                             |
| Unite Private Networks, LLC                       |
| vCom Solutions                                    |
| Velocity Networks Inc.                            |
| VoIPStreet, Inc.                                  |
| Vonage Holdings Corp.                             |
| WildBlue Communications, Inc.                     |
| Windjammer Communications LLC                     |