# Commonwealth of Virginia

Virginia Center for Innovative Technology

Virginia Information Technologies Agency

Virginia Information Technologies Agency
Virginia Geographic Information Network

Virginia Tech
Center for Geospatial Information Technology

**NTIA STATE BROADBAND DATA DEVELOPMENT**

ROUND 6 - Fall 2012 SUBMISSION

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## Summary of Virginia Submission

The Virginia Center for Innovative Technology (CIT) was designated by the Governor of Virginia as the primary point of contact for all Commonwealth of Virginia participation in the National Broadband Mapping Project. The CIT worked in conjunction with the Virginia Information Technologies Agency's (VITA) Virginia Geographic Information Network (VGIN) to review, process, normalize and submit the information outlined in the National Telecommunications and Information Administration's (NTIA) Notice of Funding Availability (NOFA) establishing a Virginia iteration of the National Broadband Map.

The fall 2012 submission to the NTIA includes data from 56 broadband service providers with unique federal identifications delivered in various formats ranging from GIS shape files to text files detailing broadband availability. To provide a complete snapshot of broadband availability in Virginia, the spring 2011 submission data was carried forward for several remaining broadband providers while some carry over providers were reworked for the 2010 census block request.

A summary of the Fall 2012 submission data includes:

| | |
|---|---|
| Address point data | 0 |
| Census Block polygons provided with coverage information | 397868 |
| Street Segments provided with availability information | 64787 |
| Wireless polygons with coverage | 27 |
| Middle Mile points with availability information | 596 |
| Community Anchor Institution points with availability information | 4075 |

All broadband providers participating provided advertised speed information for wireless polygons, census block, road centerline segment, or addresses.

There are a total of 174 broadband providers that have been identified through various sources within the Commonwealth of Virginia as of April 1, 2012. There are 68 providers who are participating in the national program and 106 who have not responded to a call for data. Virginia has an on-going effort to contact the providers who have not responded to offer any assistance needed for them to participate.

As of the fall 2012 NTIA SBDD submission, Virginia has elected to no longer submit addresses as point data. All address data has been geocoded to the VA road centerline locater and road segments were then selected by location and loaded to the NTIA data model. This change in processing procedure creates a redistribution of the total record counts by feature class.

## Virginia Broadband Data Verification and Validation

Verification Techniques

In the fall of 2010, the Virginia broadband mapping team subcontracted with Apex-CoVantage to provide the following one-time broadband data verification techniques using standardized questionnaires for the Commonwealth of Virginia:

- Telephone interviews
- Field (door to door) interviews
- Direct mailings
- Drive Testing
- GPS data collection at field interview sites

A total of 2,421 surveys were conducted, with 616 in-person and 1,805 by telephone.

Validation Methods

Using the NTIA definitions for served/under-served/unserved combined with Census demographics and Virginia broadband availability data, the Virginia Tech mapping team produced an estimated Broadband "serve-ability" Census Block map for Virginia. From this the Apex team then identified a geographically stratified (rural/urban) statistically significant sample size for which to apply the above data verification techniques.

Results

The effort resulted in the following findings:

- Surveys confirming Wireline Provider access: 97.3%
- Surveys confirming Wireless Provider Access: 99.7%
- Surveys confirming Internet Service Provider: 91.1%

In addition, the survey questionnaires confirmed valuable location information (lat/long & address) along with details about internet service provider and demographic information.

Percentages as of April 1, 2012.

## Base Map Data

VGIN maintains statewide imagery, road centerline, and address point feature classes. a VGIN also maintains a series of statewide base map data sets, or partnerships with commercial entities which allow the granularity of data necessary to support the National

Broadband Mapping Project. The following Virginia and Federal data sets are used in SBDD data processing.

*Road Centerlines (RCL)* – VGIN maintains a statewide road centerline feature class that is updated quarterly using locality centerline submissions. This road centerline database contains address range information when it is provided by the locality. The RCL database is used to generate a geocoding service which is an interpolated point along a centerline that is fed into the Virginia statewide composite geocoding web service.

*TIGER 2010 Census Blocks* – 2010 Census geometry that is available to the broadband mapping project for location and presentation of broadband data.

## Selection Set Feature Classes

Before any provider information was processed, a geodatabase of selection set feature classes was created and individual feature classes were created for use in the fall 2012 data submission. In order to support the processing of broadband data based on select by location, feature classes were set up into a selection feature database which allowed subsets of provider information to be joined spatially or by attributes and schema to be used seamlessly from the processing environment to the transfer data model. Each feature class of interest was an import of the most recent iteration the NTIA SBDD data model schema (June 2012). Features from Virginia base map data were ETL'd using appropriate field mapping. The following are layers used in the Selection Set geodatabase:

*Road Centerlines* - Virginia RCL data has address ranges in the form of four fields; from left, to left, from right, & to right. Two fields were added in the VA State RCL output for address high and low and calculated based on several selection queries. A blank schema feature class of the roads was added and the field V_LEID (VA RCL unique ID) was added to the feature class. This customized statewide data set from the Virginia RCL Quarter 2 of 2011 was then loaded to a selection set feature class which cloned the schema of the NTIA SBDD model feature class called BB_Service_RoadSegment. Unique IDs from the VA centerline were loaded to the selection set road centerline feature class. All Broadband related fields (DBA, FRN, TransTech, etc.) assumed default values of the NITA data model and were <Null> or blank.

*2010 Census Blocks Less than 2 Square miles* - A field in a staging feature class for the 2010 TIGER census blocks called SQ_MI_VA_LAMBERT was added to the selection set feature class and was created in the NAD_1983_Virginia_Lambert (Meters) projection and calculated to the WGS_84 data set. This process was used in Square Mile QC. All blocks greater than two square miles were removed from this feature to ensure all joined

data sets would yield a match from a provider spreadsheet to a block in the selection feature class and the match would be less than two square miles only. 2010 Tiger blocks were loaded into the NTIA model directly using the schema of the NTIA SBDD data model for the feature class BB_Service_CensusBlock. GEOID values in the 2010 data were mapped to the FIPS values in the NTIA schema and other related block data was matched with its appropriate field name. Broadband related fields assumed default values of the NTIA data model.

## Broadband Provider Processing Environment

To support the processing of broadband provider information separately, a broadband provider specific staging geodatabase was created. Each broadband provider participating in the fall 2012 NTIA submission had its own geodatabase and data was processed completely independent of all other broadband providers, allowing providers to move through the process at different rates. This procedure also allowed the correction of any data problems specific to broadband providers without affecting the entire submission database.

A naming convention for each selection set feature class was used and called "NTIA_" and the feature class type. "NTIA_Roads" were loaded to the transfer data model feature class BB_Service_RoadSegment, "NTIA_Census_Blocks" were loaded to the transfer data model BB_Service_CensusBlock feature class, and depending on provider category "NTIA_Wireless" was loaded to the transfer data model BB_Service_Wireless. Once the broadband provider data was processed to a point in its native feature class in the staging geodatabase which fully conformed to the NTIA specifications, it was included in the Virginia submission for quality control and subsequent delivery.

## Generalized Broadband provider Data Processing

Broadband provider processing was accomplished using selection set feature classes and the appropriate geometry. Data was reported in many different categories and each of these reporting formats was handled differently. While there were other NTIA SBDD data sets that were provided differently from providers (pricing, speed by region), they were considered separate use cases than base layer data since the output of these secondary data sets was not primarily geospatial. The following are GIS data layers reported in the SBDD data model.

*Wireless Service Area Polygon Reporting* – Service Area Polygons were reported by Wireless Broadband providers and required little processing to be included in the NTIA SBDD data model. Typical inclusion processes included attribute validation and use of the ESRI Simple Data Loader or Copy and Paste.

*Census Block Reporting* – Broadband providers reporting broadband availability on a census block basis submitted it in list form a majority of the time. These lists came in the form of spreadsheets and text files. These lists were normalized into spreadsheets and then imported into a provider staging geodatabase table. An attribute join using the full census block ID was completed to the Selection Set census block feature class. Census blocks less than 2 square miles were exported to a separate feature class to use in processing address and/or road centerline data also sent by the provider.

*Address Reporting* – Some providers reported data in census blocks less than two square miles but also included customer addresses for blocks greater than two square miles.

The majority of wireline providers reporting broadband availability on a service address basis submitted data which DID NOT differentiate where their addresses fell within blocks less than or greater than two square miles. In order to convert the provider's data to the NTIA spatial parameters of block and centerline differentiation, all lists were converted to spreadsheets and were incorporated into the SBDD submission in a two tiered approach using the NTIA and VGIN's understanding of broadband coverage:

1) Geocoded to VGIN's address point locator, then blocks less than two square miles were selected where a geocoded point fell within.

2) Addresses that did not achieve a result from the address point geocode or were outside of blocks less than two square miles were re-geocoded to VGIN's Road Centerline locator and point results were spatially joined to the selection set RCL data providing a centerline feature output. Addresses were first geocoded against the statewide address point database.

*Road Segment Address Reporting* – Broadband providers reporting broadband availability using road address ranges submitted the data in a non-spatial list in a majority of cases, although several providers did send in TIGER lines or VA RCL data. These lists were normalized into a series of spreadsheets when processing the individual provider. The data was either used in joining to census features by Tiger Line ID (TLID) and then selecting by location from the selection set RCL data or used raw in geospatial format and selected.

*Community Anchor Institutions* –
Virginia's CAI data has additional attribution beyond the NTIA data model due to the source of the VA data set. VGIN and Virginia Tech both house CAI data although the record counts for tables are not identical. The master VGIN geospatial feature class is used in submission to the SBDD project while changes from Virginia Tech are generally conflated.

Virginia Tech held speed tests in 2009 and this information was applied to the NTIA SBDD transfer data models of the past. With the inclusion of attribute values for subscriber upload and subscriber download speeds with the most recent NTIA model for the Spring

2012 submission, Virginia Tech provided VGIN with an export of its most recent database to include speed testing held in 2011 in the SBDD Transfer Data model CAI feature class. Included were a subset of features based on CAI category and were not the entire CAI feature class so features in the VT data were then applied to the VGIN submission feature class.

In order to apply changes from the Virginia Tech update to the VGIN NTIA submission data, the VGIN CAI point feature classes as well as the VT point feature class update were imported into a staging file Geodatabase. The VT update was buffered 5 feet and output to a buffer feature class which included the same attribution as the point feature class. The point was spatially joined to the buffer feature class and values were calculated within the point data to include updates to speeds and transmission technologies where captured by VT. Of the total features, approximately 100 features did not fall within the buffers and were not spatially joined. These values were either features which the VT feature class contained and the VGIN feature class did not, or the geometry locations were different for the same feature. These remaining buffered features were exported to a separate feature class to use in manually adding changes to the VGIN point data. For each feature not available in the VGIN CAI features, the data was copied from the Virginia Tech data and placed in the VGIN CAI feature class. For each feature that were in both databases but spatial location was different, the ESRI ArcGIS Attribute Transfer functionality was used to conflate speed values.

In order to represent the data with 2010 census geography as requested by the NTIA for the Fall 2011 SBDD submission, data was then spatially joined to the 2010 census block data and output in the working Geodatabase feature class. The resulting feature class was calculated for the full FIPS ID and this was loaded to the transfer data model in the NTIA SBDD format.

*Middle Mile* – The majority of providers do not send middle mile data. When it is received it is converted into a geodatabase table in the broadband provider's staging geodatabase. An add XY function was performed in ArcMap and XY events were exported as a new feature class. Inside the provider's staging geodatabase, the NTIA SBDD data model feature class named BB_ConnectionPoint_MiddleMile was imported and renamed NTIA_middle_mile. Data was either loaded to this feature class and all appropriate fields were calculated based on the XY event in order to load data spatially or if only a handful of points were provided the data was manually edited in an edit session.

*Pricing* - If nominal weighted subscriber speed was available from a broadband provider, the data was placed into an excel spreadsheet for the spring 2012 submission which followed the format of requested text output information from NTIA. It was then output to a requested tab delimited text file for the release. All providers who had previously sent in pricing data but had not submitted an update for the spring 2012 release were carried over into the spring 2012 pricing spreadsheet.

*Speed based on CMA/MSA/RSA* - If speed was available by cellular market area or MSA/RSA and provided to CIT and VGIN, this information was placed into a newly created SDE feature class which tracked the most current speed from a provider. If the provider was a new or updated submission, the feature class was updated with the most recent speed data. All archive speed data was located and custom areas of interest were added as polygons in this feature class.

## Processing QC, Batch Calculation, & Loading

While some provider data imported directly, where information for 2010 census geography was needed (Census Blocks, Middle Mile, Address Points) the feature of interest was imported and processed differently depending on the type of geography stored. Not all providers submitted census blocks to the NTIA but those who did were validated with a field in the selection set census block layer which contained square mileage calculated on the VA Custom Lambert projection.

For data reported as service addresses, several fields were required that could be calculated in batch. The FULLFIPSID was calculated to the address points by spatially joining points to the census blocks. Latitude and Longitude were calculated in ArcCatalog using the calculate geometry function.

Only a few broadband providers who participated in the fall 2012 NTIA submittal provided Middle mile data. Resultantly, the processing and aggregation of a middle mile data set was done outside of standard broadband provider data processing.

Address Points, Road Centerlines, Census blocks, and Wireless Service polygons were processed as broadband provider data was received although middle mile information was a post processing step. To create middle mile event data, the broadband providers that provided the information to CIT and VGIN generally included latitude and longitude of the facility and these values were used in ArcGIS with the add XY function. After points were brought into ArcGIS, data was exported into a separate feature class and values were calculated based on information the broadband provider provided.

## Specific Broadband Provider Processing Methodology

The following Broadband Providers submitted data for the fall 2012 NTIA submission. It is assumed that the participating Broadband providers provided entire coverage as opposed to update only data sets unless otherwise noted. Included are the methods used in updating the Virginia Broadband map data:

| Broadband Provider | FCC Registration Number |
|---|---|
| | |
| | |
| AT&T Wireless | 0004979233 |
| BIT Communications | 0002031698 |
| CenturyLink | 0018626853 |
| Charter Communications, Inc. | 0017179383 |
| Cogent Communications Group | 0019066034 |
| Comcast | 0004441663 |
| Covad Communications Company | 0003753753 |
| Cox Communications | 0001524461 |
| Cricket Communications, Inc. | 0002963528 |
| Highland Telephone Cooperative | 0004318846 |
| Mid-Atlantic Broadband Cooperative | 0019765304 |
| Northern Neck Wireless Internet Services, LLC | 0017338054 |
| Nelson County | 0002033850 |
| NTELOS Inc. | 0005849518 |
| NTELOS (Richmond 20 MHz LLC) | 0001656180 |
| NTELOS (Virginia PCS Alliance, L.C.) | 0002051720 |
| NTELOS (West Virginia PCS Alliance, L.C.) | 0002049328 |
| NTELOS Telephone Inc. | 0002073138 |
| NTELOS Network Inc. | 0003742442 |
| Roanoke and Botetourt Telephone Company | 0003775244 |
| R&B Network Inc. | 0003775301 |
| RCN | 0003735016 |
| Shentel Cable Company | 0018024075 |
| Shentel Service Company | 0013393988 |
| Sidera Networks | 0006254403 |
| Skyline Telephone Membership Corporation | 0001952555 |
| Sprint Nextel Corporation | 0003774593 |
| Starband Communications Inc. | 0005087457 |
| Suddenlink Communications | 0014848808 |
| T-Mobile | 0006945950 |
| TDS Telecom (Amelia Telephone Corporation) | 0002073526 |
| TDS Telecom (New Castle Telephone Company) | 0003767399 |
| TDS Telecom (Virginia Telephone Company) | 0002058261 |
| Time Warner Cable | 0013430244 |
| Verizon Wireline | 0002073203 |
| Verizon Wireless | 0003290673 |
| VSAT Systems, LLC. (Skycasters) | 0001875615 |
| XO Communications | 0006275945 |
| | |

### *AT&T Mobility, LLC*

AT&T wireless provided geospatial data in the form of three polygon shape files. No Middle mile data was included as no updates had occurred, so the spring 2012 submission was carried over to the fall 2012 NTIA data model.

Inside the shapefiles (3G, 4G, and LTE) provided by AT&T were over 2300 polygon records with no meaningful attribution, and gridded for internal use. Each shape file was copied for editing into a staging database and all were attributed appropriately. The 4G and LTE polygons were then merged into a single record due to having identical attribution. The records were then loaded into the VGIN NTIA transfer data model.

| | |
|---|---|
| *Provider Name:* | AT&T Mobility, LLC |
| *DBA Name:* | AT&T Mobility, LLC |
| *FRN:* | 0004979233 |
| *Transmission Technology* | 80 |
| *Wireless Polygons:* | 2 |
| *2010 Census Blocks <2 Square miles:* | 0 |
| *Address Point features:* | 0 |
| *Road Centerline features:* | 0 |
| *Middle Mile features:* | 1 |
| *Community Anchor Institutions reported:* | 0 |

### *BIT Communications*

BIT Communications provided a hand drawn map overlay over a street map. A matching polygon shapefile was created to create the overlay drawing in ArcMap. Using the select by location tool, the road segments within the overlay that had broadband data where selected and exported into a shapefile. This shapefile was then edited and loaded to the NTIA Transfer data model.

| | |
|---|---|
| *Provider Name:* | Buggs Island Telephone Cooperative |
| *DBA Name:* | BIT Communications |
| *FRN:* | 0002031698 |
| *VA Data Category:* | 1 |
| *Wireless Polygons:* | 0 |
| *2010 Census Blocks <2 Square miles:* | 0 |
| *Address Point features:* | 0 |
| *Road Centerline features:* | 1 |
| *Middle Mile features:* | 0 |
| *Community Anchor Institutions reported:* | 0 |

### *CenturyLink*

CenturyLink provided geospatial data in the form of road centerlines and census blocks and reported to CIT that the census Geography was in 2011. Middle mile and subscriber weighted speed were not included this round and were carried over from the most recent data submission into the speed SDE layer and pricing spreadsheet.

Census blocks less than two square miles were joined to the Selection Set Census block data using the FULLFIPSID. The joined block data was output to new features, and attribution corrected as needed, and then the records were appended to the Transfer data model.

In order to provide the Road Centerline data in Virginia's geometry (VBMP RCL Quarter 2, 2011), the road lines provided by Century Link were used in a select by location analysis. The Virginia Road Centerline Selection set was selected if the lines provided by CenturyLink were within 100 feet and then exported to a new feature class. This was done on a unique attribution grouping basis, such that each exported record set could be calculated identically – and then all were remerged together. This iteration of the roads was loaded into the NTIA transfer data model.

| | |
|---|---|
| *Provider Name:* | CenturyTel, Inc. |
| *DBA Name:* | CenturyLink |
| *FRN:* | 0018626853 |
| *VA Data Category:* | 1 |
| *Wireless Polygons:* | 0 |
| *2012 Census Blocks <2 Square miles:* | 30269 |
| *Address Point features:* | 0 |
| *Road Centerline features:* | 22716 |
| *Middle Mile features:* | 1 |
| *Community Anchor Institutions reported:* | 0 |

***Charter***

Charter provided Geospatial data in the form of road centerlines and 2010 census blocks (< 2 square mile) for two different transmission types, as well as middle mile data. All were in a shape file format. No new subscriber-weighted nominal speed data was sent therefore that data was carried over from the fall 2011 submittal.

There were no changes to the middle mile data from the last submission and the data was carried over to the October NTIA data model.

The census block shp file contained only a portion of the attributes needed to meet the NTIA standards. A select by location was performed using the census block feature class in the VA Selection Set and all identical polygons matching the census blocks from Charter were exported to a shape file. All attributes were populated in the exported shape file and then loaded into the VGIN NTIA transfer data model.

In order to provide the Road Centerline data in Virginia's geometry (VBMP RCL Quarter 1, 2012) and eliminate the bulk of ancillary roads from TIGER lines, the road lines provided by Charter were used in a select by location analysis. A select by location was performed using the road centerline feature class in the VA Selection Set to select road lines that were within 2 meters of the lines submitted by Charter. The selected data was then

exported to a shape file and the NTIA attributes were populated before loading into the VGIN NTIA transfer data model.

| | |
|---|---|
| *Provider Name:* | Charter Communications, Inc. |
| *DBA Name:* | Charter Communications, Inc. |
| *FRN:* | 0017179383 |
| *Transmission Technology* | 40,41 |
| *Wireless Polygons:* | 0 |
| *2010 Census Blocks <2 Square miles:* | 6526 |
| *Address Point features:* | 0 |
| *Road Centerline features:* | 238 |
| *Middle Mile features:* | 3 |
| *Community Anchor Institutions reported:* | |

### *Comcast*

Comcast provided census block and address number spreadsheets. Speed data was provided by region in a spreadsheet and the values inside were checked against the SDE Speed by region polygon feature class. A staging file geodatabase was created for this provider and the census block spreadsheet information was imported as a table.

The spreadsheet for blocks less than two miles was imported to the staging database and joined to the census block feature class in the VGIN VA Selection Set. The joined data was then exported to a new feature class. The features in this new layer were selected by location to the SDE speed feature class in order to apply maximum down and upload speeds which were reported in the speed spreadsheet.

Address level data was geocoded to the VGIN Road Centerline address locator. Point results were then spatially joined to the selection set Road Centerline features in order to obtain a centerline feature class geometry. Select by location was performed to the SDE speed feature class in order to apply speed information to the resulting centerline features. Additional fields were populated.

To date, middle mile features or community anchor institution data has not been provided by Comcast.

| | |
|---|---|
| *Provider Name:* | Comcast Cable Communications, LLC |
| *DBA Name:* | Comcast |
| *FRN:* | 0004441663 |
| *Transmission Technology* | 40, 41 |
| *Wireless Polygons:* | 0 |
| *2010 Census Blocks <2 Square miles:* | 52,852 |
| *Address Point features:* | 0 |
| *Road Centerline features:* | 6,070 |
| *Middle Mile features:* | 0 |

*Community Anchor Institutions reported:* 0

### *Covad Communications Company*

Covad provided Census Blocks, Address ranges, Middle Mile, subscriber pricing, and speed by region as text files. This data was normalized to spreadsheets. A staging geodatabase was created and the spreadsheets were imported as feature class tables. The pricing information was added directly from the imported spreadsheet to the provider aggregate pricing spreadsheet while the Middle mile and speed data were checked and no updates were necessary to make in the Middle mile point and Speed polygon feature classes so values were carried over from the fall 2012 submission.

Covad provided different transmission technology speeds within the same geometric features so the output product need was stacked geometry. In order to geographically represent the data this way, for Census Block and Address Segment data, transmission type was selected and a separate geodatabase table was exported for each. There were 3 tables for Census Blocks created; 10, 20, & 30. There were 3 tables for address ranges created; 10, 20, & 30. Each of these were joined to the appropriate feature class individually, exported as a separate feature class, and then loaded to a single feature class per geometry.

The census block text file contained varying transmission technologies. It was checked against the spring 2012 submission and changes were present in the blocks for Transmission Technology of 10. Since it was assumed there could potentially be changes for all three types, all blocks were reprocessed for fall 2012. Three output tables created for each Covad Transmission Technology Type and each table was individually joined to the selection set census block layer to verify record number counts. The joins all were successful, signifying that the data was indeed in 2010 geography so they were exported to a separate feature class per table. The three feature classes were populated based on table attributes and were then loaded to the NITA transfer data model.

Address Ranges were checked against the spring 2012 submission and records were identical. Since this information was the same, the centerlines were exported from the spring submission to the Covad staging database and then loaded to the fall 2012 Transfer Data Model.

| | |
|---|---|
| *Provider Name:* | DIECA Communications, Inc. |
| *DBA Name:* | Covad Communications Company |
| *FRN:* | 0003753753 |
| *Transmission Technology* | 10, 20 , 30 |
| *Wireless Polygons:* | 0 |
| *2010 Census Blocks <2 Square miles:* | 124,923 |
| *Address Point features:* | 0 |
| *Road Centerline features:* | 1,243 |
| *Middle Mile features:* | 6 |
| *Community Anchor Institutions reported:* | 0 |

***Cox***

Cox provided census block, address number, middle mile, and speed text files that were converted into spreadsheets. Speed data was provided by region in a spreadsheet and the values inside were checked against the VA SDE Speed by region polygon feature class. A staging file geodatabase was created for this provider and the census block spreadsheet information was imported as a table.

The spreadsheet for blocks less than two miles was imported to the staging database and joined to the census block feature class in the VGIN VA Selection Set. The joined data was then exported to a new feature class. The features in this new layer were selected by location to the SDE speed feature class in order to apply maximum down and upload speeds which were reported in the speed spreadsheet.

Address level data was geocoded to the VGIN Road Centerline address locator. Point results were then spatially joined to the selection set Road Centerline features in order to obtain a centerline feature class geometry. Select by location was performed to the SDE speed feature class in order to apply speed information to the resulting centerline features. Additional fields were populated.

Middle mile features were checked against the spring 2012 NTIA SBDD submission and not apparent changes were noticed. The point information was reused.

| | |
|---|---|
| *Provider Name:* | CoxCom Inc. |
| *DBA Name:* | Cox Communications |
| *FRN:* | 0001524461 |
| *Transmission Technology* | 40 |
| *Wireless Polygons:* | 0 |
| *2010 Census Blocks <2 Square miles:* | 28,329 |
| *Address Point features:* | 0 |
| *Road Centerline features:* | 1,079 |
| *Middle Mile features:* | 4 |
| *Community Anchor Institutions reported:* | 0 |

***Cricket***

Cricket provided Geospatial data in the form of a coverage area shape file. The coverage foot print had changed from the last submittal. The shape file was copied and pasted into the VGIN NTIA Transfer data model BB_Service_Wireless feature class and attributes were populated as listed in the source data.

| | |
|---|---|
| *Provider Name:* | Leap Wireless International, Inc. |
| *DBA Name:* | Cricket Communications, Inc. |
| *FRN:* | 0002963528 |

| | |
|---|---|
| *Transmission Technology* | 80 |
| *Wireless Polygons:* | 1 |
| *2010 Census Blocks <2 Square miles:* | 0 |
| *Address Point features:* | 0 |
| *Road Centerline features:* | 0 |
| *Middle Mile features:* | 0 |
| *Community Anchor Institutions reported:* | 0 |

### *Highland Telephone Cooperative*

Highland Telephone provided a document stating they had no changes to their service area but their maximum advertized download speeds have increased. The Highland data from the last submittal was edited and carried over to the VGIN Transfer data model.

| | |
|---|---|
| *Provider Name:* | Highland Telephone Cooperative |
| *DBA Name:* | Highland Telephone Cooperative |
| *FRN:* | 0004318846 |
| *Transmission Technology* | 10 |
| *Wireless Polygons:* | 0 |
| *2010 Census Blocks <2 Square miles:* | 150 |
| *Address Point features:* | 0 |
| *Road Centerline features:* | 0 |
| *Middle Mile features:* | 2 |
| *Community Anchor Institutions reported:* | 0 |

### *HughesNet*

HughesNet is a satellite provider and sent data in the form of census blocks. When previewing the data and joining the data to Virginia's statewide block feature class, all blocks were added to the join. This signified that Hughes covers the entire Commonwealth of Virginia. Since this was the cases, the Virginia boundary was copied and provided as the geospatial footprint. Attributes for Provider Name, DBA, FRN, transmission technology, and advertised speeds were included in a communication e-mail. Spectrum was assumed Satellite due to Transmission Technology type. A staging database was created and used, data was then loaded into the NTIA transfer database.

| | |
|---|---|
| *Provider Name:* | Hughes Network Systems, LLC |
| *DBA Name:* | HughesNet |
| *FRN:* | 0012369286 |
| *Transmission Technology* | 60 |
| *Wireless Polygons:* | 1 |
| *2010 Census Blocks <2 Square miles:* | 0 |
| *Address Point features:* | 0 |
| *Road Centerline features:* | 0 |
| *Middle Mile features:* | 0 |
| *Community Anchor Institutions reported:* | 0 |

***Lumos***

Lumos (Formerly NTELOS Wireline) provided an update of spreadsheets for census blocks less than two square miles and customer addresses for blocks greater than two square miles. For each geography type, a spreadsheet was available for their DSL and Fiber product locations. The data in the blocks less than two square miles had a latitude and longitude field (XY) so this was used in finding a location for both transmission technology types. Blocks from the selection set feature class were selected by location from the centroid of the point for each transmission technology type and the attribute information was processed to the individual block feature.

The addresses in blocks greater than two square miles were geocoded against the VGIN Road Centerline address locator. These points were spatially joined to the selection road centerline feature and output to a new feature class for both DSL and Fiber tables. Attributes were available from the spatial join in the newly created centerline feature classes.

All Census Block and Road Centerline feature classes were loaded into the transfer data model. Middle Mile was not reported for the fall 2012 submission so the last received middle mile point information was updated for Lumos (formerly NTELOS Wireline) in the provider's staging database and loaded to the transfer data model.

| | |
|---|---|
| *Provider Name:* | Lumos |
| *DBA Name:* | Lumos Telephone, Inc. |
| *FRN:* | 0002073138 |
| *Transmission Technology* | 10, 50 |
| *Wireless Polygons:* | 0 |
| *2010 Census Blocks <2 Square miles:* | 2,164 |
| *Address Point features:* | 0 |
| *Road Centerline features:* | 421 |
| *Middle Mile features:* | 2 |
| *Community Anchor Institutions reported:* | 0 |

| | |
|---|---|
| *Provider Name:* | Lumos |
| *DBA Name:* | Lumos Networks Inc. |
| *FRN:* | 0003742442 |
| *Transmission Technology* | 10, 50 |
| *Wireless Polygons:* | 0 |
| *2010 Census Blocks <2 Square miles:* | 1,209 |
| *Address Point features:* | 0 |
| *Road Centerline features:* | 0 |
| *Middle Mile features:* | 50 |
| *Community Anchor Institutions reported:* | 0 |

| | |
|---|---|
| *Provider Name:* | Lumos |
| *DBA Name:* | Lumos Telephone of Botetourt, Inc. |
| *FRN:* | 0003775244 |
| *Transmission Technology* | 10, 50 |

| | |
|---|---|
| *Wireless Polygons:* | 0 |
| *2010 Census Blocks <2 Square miles:* | 578 |
| *Address Point features:* | 0 |
| *Road Centerline features:* | 273 |
| *Middle Mile features:* | 14 |
| *Community Anchor Institutions reported:* | 0 |

### *Mediacom*

Mediacom submitted address data in a spreadsheet. The address data was scrubbed and geocoded. The matched and tied records were overlaid on 2010 census blocks for review. All address points except one fell inside census blocks less than two. Census blocks less than 2 square miles that contained address points were exported to a new feature class in the Mediacom staging database. The NTIA census block attributes were populated from the provider's data. The address point that fell outside blocks less than two square miles was used to select the corresponding road segment. The road segment attributes were then populated from the provider's data and exported to a new feature class.

The Mediacom Census Block and Road Segment feature classes were then loaded to the VGIN Transfer data model.

| | |
|---|---|
| *Provider Name:* | Mediacom Southeast LLC |
| *DBA Name:* | Mediacom |
| *FRN:* | 0004036778 |
| *Transmission Technology* | 41 |
| *Wireless Polygons:* | 0 |
| *2010 Census Blocks <2 Square miles:* | 7 |
| *Address Point features:* | 0 |
| *Road Centerline features:* | 1 |
| *Middle Mile features:* | 0 |
| *Community Anchor Institutions reported:* | 0 |

### *MetroCast Communications*

MetroCast provided census tracts in the form of a spreadsheet where they claim they can provide service. Since the tracts were not Geospatial, the data was selected from 2010 TIGER census tract features and then imported into MetroCast's staging geodatabase. Census blocks in the selection set feature class were selected by location where a selection set census block centroid was within a MetroCast census tract. All census block polygons were exported to a feature class for loading.

Road centerlines from the selection set feature class were used in select by centroid to the MetroCast census tract feature class. Features that fell within the polygon area were extracted to a separate staging feature class within the provider staging database and the staging centerline features were selected by the polygons. Any centerline that fell

outside the census block features were kept and exported a new feature class used for loading to the transfer data model.

The census block and centerline feature classes used for loading were then edited and calculated appropriately for the attributes submitted by the provider. After all features were updated, both data sets were loaded into the NTIA Transfer Data Model.

| | |
|---|---|
| *Provider Name:* | Gans Communications, LP |
| *DBA Name:* | MetroCast Communications |
| *FRN:* | 0018547471 |
| *Transmission Technology* | 40 |
| *Wireless Polygons:* | 0 |
| *2010 Census Blocks <2 Square miles:* | 11,649 |
| *Address Point features:* | 0 |
| *Road Centerline features:* | 1,530 |
| *Middle Mile features:* | 0 |
| *Community Anchor Institutions reported:* | 0 |

### *Nelson County*

The County of Nelson is a new backbone provider who submitted geospatial middle mile data in the form of a shape file. A provider staging geodatabase was created to edit and format the middle mile attributes for loading into the VGIN NTIA transfer data model.

| | |
|---|---|
| *Provider Name:* | County of Nelson |
| *DBA Name:* | County of Nelson |
| *FRN:* | 0002033850 |
| *Transmission Technology* | 50 |
| *Wireless Polygons:* | 0 |
| *2010 Census Blocks <2 Square miles:* | 0 |
| *Address Point features:* | 0 |
| *Road Centerline features:* | 0 |
| *Middle Mile features:* | 4 |
| *Community Anchor Institutions reported:* | 0 |

### *Northern Neck Wi-Fi*

Northern Neck Wireless was contacted regarding the creation of a propagation model for their coverage area. Previous submissions have been in the form of address level data even though they are a wireless provider. The spring 2011 address level data was geocoded and points buffered to create polygons of limited accuracy.

Northern Neck provided the required tower and antenna data for creating a propagation model but because of time constraints we are unable to submit the new data at this time. The carryover polygon information from spring 2011 was loaded into the transfer data model as well.

| | |
|---|---|
| *Provider Name:* | Northern Neck Wireless Internet Services, LLC |
| *DBA Name:* | Northern Neck Wireless Internet Services, LLC |
| *FRN:* | 0017338054 |
| *Transmission Technology* | 70 |
| *Wireless Polygons:* | 2 |
| *2010 Census Blocks <2 Square miles:* | 0 |
| *Address Point features:* | 0 |
| *Road Centerline features:* | 0 |
| *Middle Mile features:* | 0 |
| *Community Anchor Institutions reported:* | 0 |

### *nTelos Wireless*

NTelos Wireless provided four separate polygons within a shape file. These four separate polygons were merged into one polygon layer to show an aggregate image of nTelos' Wireless coverage. A provider staging geodatabase was created. The polygons were then copied and pasted into the VGIN NTIA transfer data model and normalized to match the formatting requirements. The file was loaded to the VGIN NTIA transfer data model.

| | |
|---|---|
| *Provider Name:* | NTELOS, Inc. |
| *DBA Name:* | NTELOS |
| *FRN:* | 0005849518 |
| *Transmission Technology* | 80 |
| *Wireless Polygons:* | 1 |
| *2010 Census Blocks <2 Square miles:* | 0 |
| *Address Point features:* | 0 |
| *Road Centerline features:* | 0 |
| *Middle Mile features:* | 0 |
| *Community Anchor Institutions reported:* | 0 |

| | |
|---|---|
| *Provider Name:* | Richmond 20MHz, LLC |
| *DBA Name:* | NTELOS |
| *FRN:* | 0001656180 |
| *Transmission Technology* | 80 |
| *Wireless Polygons:* | 1 |
| *2010 Census Blocks <2 Square miles:* | 0 |
| *Address Point features:* | 0 |
| *Road Centerline features:* | 0 |
| *Middle Mile features:* | 0 |
| *Community Anchor Institutions reported:* | 0 |

| | |
|---|---|
| *Provider Name:* | Virginia PCS Alliance, L.C. |
| *DBA Name:* | NTELOS |
| *FRN:* | 0002051720 |
| *Transmission Technology* | 80 |
| *Wireless Polygons:* | 1 |
| *2010 Census Blocks <2 Square miles:* | 0 |
| *Address Point features:* | 0 |
| *Road Centerline features:* | 0 |
| *Middle Mile features:* | 0 |
| *Community Anchor Institutions reported:* | 0 |

| | |
|---|---|
| *Provider Name:* | West Virginia PCS Alliance, L.C. |
| *DBA Name:* | NTELOS |
| *FRN:* | 0002049328 |
| *Transmission Technology* | 80 |
| *Wireless Polygons:* | 1 |
| *2010 Census Blocks <2 Square miles:* | 0 |
| *Address Point features:* | 0 |
| *Road Centerline features:* | 0 |
| *Middle Mile features:* | 0 |
| *Community Anchor Institutions reported:* | 0 |

### *RCN Telecom Services LLC*

RCN provided a spreadsheet of address availability and middle mile points for the spring 2012 submission. A provider staging geodatabase was created and both files were imported as tables for normalization. The Address availability import table was geocoded and matched records were kept, while unmatched and tied results were exported to a separate table in the geodatabase. It was determined that all matched address points were within census blocks less than two square miles. A spatial selection of the census blocks containing the address points was performed and NTIA attributes were populated from the providers address data. The census block feature class was then loaded into the VGIN NTIA Transfer data model.

The middle mile data provided this round was reviewed and had not changed from the spring 2012 submittal so the spring 2012 data was loaded into the VGIN Carry Over data model.

| | |
|---|---|
| *Provider Name:* | Starpower Communications LLC |
| *DBA Name:* | RCN Telecom Services LLC |
| *FRN:* | 0003735016 |
| *Transmission Technology* | 40, 41 |
| *Wireless Polygons:* | 0 |
| *2010 Census Blocks <2 Square miles:* | 142 |
| *Address Point features:* | 0 |
| *Road Centerline features:* | 0 |
| *Middle Mile features:* | 2 |
| *Community Anchor Institutions reported:* | 0 |

### *Scott County Telephone Cooperative (SCTC)*

SCTC provided an update for the fall 2012 release as a polygon coverage area to signify where their Fiber and DSL technology information is located. The polygon data was in several feature classes and was imported and worked into a single feature class which represented both technologies. It was confirmed by SCTC that the tech types did not overlap and also that the provider did not have middle mile information to provide to NTIA.

Census blocks in the selection set feature class were selected by location where a selection set census block centroid was within a SCTC polygon feature based on Transmission Technology type. All census block polygons were exported to a feature class for loading; the feature class contained both DSL and Fiber optic.

Road centerlines from the selection set feature class were used in select by centroid to the SCTC polygon feature class. Features that fell within the polygon areas were extracted to a separate staging feature class within the provider staging database and the staging centerline features were selected by the polygons and calculated by Transmission Technology. Any centerline that fell outside the centroid of a census block feature was kept and exported to a new feature class used in loading to the transfer data model.

The census block and centerline feature classes used for loading were then edited and calculated appropriately for speed information based on Transmission Technology types. After all features were updated, both data sets were loaded into the NTIA Transfer Data Model.

| | |
|---|---|
| *Provider Name:* | Scott County Telephone Cooperative |
| *DBA Name:* | SCTC |
| *FRN:* | 0002069862 |
| *Transmission Technology* | 10, 50 |
| *Wireless Polygons:* | 0 |
| *2010 Census Blocks <2 Square miles:* | 2,963 |
| *Address Point features:* | 0 |
| *Road Centerline features:* | 832 |
| *Middle Mile features:* | 0 |
| *Community Anchor Institutions reported:* | 0 |

### *Sidera Networks LLC*

Sidera provided a spreadsheet for middle mile data. Sidera Networks is a backbone provider.

The middle mile excel file was imported into the provider staging database and geocoded with a 100% match rate. The GIS file was scrubbed to add and populate fields as required by the NTIA data model. The feature class was then loaded into the Transfer Data Model.

| | |
|---|---|
| *Provider Name:* | Sidera Networks LLC f/n/a RCN New York Communications LLC |
| *DBA Name:* | Sidera Networks |
| *FRN:* | 0006254403 |
| *Transmission Technology* | 50 |
| *Wireless Polygons:* | 0 |
| *2010 Census Blocks <2 Square miles:* | 0 |
| *Address Point features:* | 0 |

| | |
|---|---|
| *Road Centerline features:* | 0 |
| *Middle Mile features:* | 9 |
| *Community Anchor Institutions reported:* | 0 |

### *Skyline Telephone Membership Corporation*

Skyline Telephone submitted data for the first time this round in the form of an address spreadsheet. This provider is located in a rural area on the border with North Carolina and the majority of their customers and all middle mile infrastructure is located in North Carolina. Less than twenty customers are served in Virginia.

The address table was imported into a staging database and overlaid with census blocks less than two square miles. All of the address points were within census blocks less than two square miles. A selection of the census blocks containing the address points was performed and NTIA attributes were populated from the providers address data. The census block feature class was then loaded into the VGIN NTIA Transfer data model.

| | |
|---|---|
| *Provider Name:* | Skyline Telephone Membership Corporation |
| *DBA Name:* | Skyline Telephone Membership Corporation |
| *FRN:* | 0001952555 |
| *Transmission Technology* | 10, 50 |
| *Wireless Polygons:* | 0 |
| *2010 Census Blocks <2 Square miles:* | 19 |
| *Address Point features:* | 0 |
| *Road Centerline features:* | 0 |
| *Middle Mile features:* | 0 |
| *Community Anchor Institutions reported:* | 0 |

### *Sprint*

Sprint provided Geospatial data in the form of a coverage area shape file and middle mile data was included in a text file.

The GIS shape file was loaded into the provider staging geodatabase and compared to the spring 2012 submission to review for changes. The area footprint was different so the attributes were scrubbed to match the NTIA reporting format. The data was then loaded into the VGIN NTIA transfer data model. Middle mile information had not changed from the last round so it was loaded to the VGIN NTIA transfer data model.

| | |
|---|---|
| *Provider Name:* | Sprint Nextel Corporation |
| *DBA Name:* | Sprint |
| *FRN:* | 0003774593 |
| *Transmission Technology* | 80 |
| *Wireless Polygons:* | 2 |
| *2010 Census Blocks <2 Square miles:* | 0 |
| *Address Point features:* | 0 |
| *Road Centerline features:* | 0 |

| | |
|---|---|
| *Middle Mile features:* | 2 |
| *Community Anchor Institutions reported:* | 0 |

### *StarBand Communications Inc.*

StarBand Communications Inc. provided geospatial data in a single coverage area shape file for the state of Virginia. A state of Virginia polygon was copied and formatted to the NTIA attribute schema and attributes were populated from the file submitted by the provider.

| | |
|---|---|
| *Provider Name:* | StarBand Communications Inc. |
| *DBA Name:* | StarBand Communications Inc. |
| *FRN:* | 0005087457 |
| *Transmission Technology* | 60 |
| *Wireless Polygons:* | 1 |
| *2010 Census Blocks <2 Square miles:* | 0 |
| *Address Point features:* | 0 |
| *Road Centerline features:* | 0 |
| *Middle Mile features:* | 0 |
| *Community Anchor Institutions reported:* | 0 |

### *Suddenlink Communications*

Suddenlink submitted data for the first time in the form of address and census block spreadsheets. Address level data was geocoded to the VGIN Road Centerline address locator. Point results were then spatially joined to the selection set Road Centerline features in order to obtain a centerline feature class geometry. The roads were then exported to a new feature class and then loaded to the VGIN Transfer data model.

The census block table was joined to the Census Block feature class in the VGIN Selection geodatabase and the Suddenlink records were exported to a new feature class. Attributes were populated from the census block spreadsheet and the data was loaded to the VGIN Transfer data model.

| | |
|---|---|
| *Provider Name:* | Cebridge Acquisition LLC |
| *DBA Name:* | Suddenlink Communications |
| *FRN:* | 0014848808 |
| *Transmission Technology* | 40, 41 |
| *Wireless Polygons:* | 0 |
| *2010 Census Blocks <2 Square miles:* | 387 |
| *Address Point features:* | 0 |
| *Road Centerline features:* | 154 |
| *Middle Mile features:* | 0 |
| *Community Anchor Institutions reported:* | 0 |

### *T-Mobile*

T-mobile provided geospatial data in the form of three coverage area shape files. In the supporting documentation, T-mobile explained attribute values for each polygon feature class. Middle mile and subscriber-weighted nominal speed data was included in tabular format.

The shapefiles provided by T-mobile were named UMTS, HSPA21, & HSPA42 and inside each shapefile were several thousand records with every single record in each feature class containing identical attribution. The data appeared to be gridded for internal use. The three shp files were imported into the provider's staging geodatabase. The polygons were merged into a single coverage polygon in the individual staging feature class and then each was copied and pasted into the VGIN NTIA transfer data model. Attributes were populated to match supporting documentation provided by T-mobile.

The middle mile and subscriber-weighted nominal speed data was unchanged from the last submittal.

| | |
|---|---|
| *Provider Name:* | T-Mobile USA, Inc. |
| *DBA Name:* | T-Mobile |
| *FRN:* | 0006945950 |
| *Transmission Technology* | 80 |
| *Wireless Polygons:* | 3 |
| *2010 Census Blocks <2 Square miles:* | 0 |
| *Address Point features:* | 0 |
| *Road Centerline features:* | 0 |
| *Middle Mile features:* | 1 |
| *Community Anchor Institutions reported:* | 0 |

### *TDS Telecom*

TDS Telecom provided geospatial data as well as source data of availability by csv files. The provider submitted data consisted of addresses and middle mile feature classes. A provider staging database was created to review each feature class. Due to inconsistencies between their address point locations and VGINs own address data, the source csv files were used in their entirety in compiling this dataset. The data was imported into the staging database for geocoding and all matched records were translated into VGIN road segments by an attribute join from the road name – and the spatial intersection to Census blocks < 2 square miles was used to retain the final delivery of road segments and Census blocks, respectively. All attributes were applied and reviewed for completeness and the census block and road segment based feature classes were loaded into the VGIN NTIA transfer data model.

Comparison of the middle mile data to the spring 2012 release, revealed no changes so values were carried over from the fall data set.

| | |
|---|---|
| *Provider Name:* | Amelia Telephone Corporation |
| *DBA Name:* | TDS Telecom |
| *FRN:* | 0002073526 |
| *Transmission Technology* | 10, 50 |
| *Wireless Polygons:* | 0 |
| *2010 Census Blocks <2 Square miles:* | 490 |
| *Address Point features:* | 0 |
| *Road Centerline features:* | 208 |
| *Middle Mile features:* | 1 |
| *Community Anchor Institutions reported:* | 0 |

| | |
|---|---|
| *Provider Name:* | New Castle Telephone Company |
| *DBA Name:* | TDS Telecom |
| *FRN:* | 0003767399 |
| *Transmission Technology* | 10 |
| *Wireless Polygons:* | 0 |
| *2010 Census Blocks <2 Square miles:* | 308 |
| *Address Point features:* | 0 |
| *Road Centerline features:* | 246 |
| *Middle Mile features:* | 1 |
| *Community Anchor Institutions reported:* | 0 |

| | |
|---|---|
| *Provider Name:* | Virginia Telephone Company |
| *DBA Name:* | TDS Telecom |
| *FRN:* | 0002058261 |
| *Transmission Technology* | 10, 50 |
| *Wireless Polygons:* | 0 |
| *2010 Census Blocks <2 Square miles:* | 138 |
| *Address Point features:* | 0 |
| *Road Centerline features:* | 126 |
| *Middle Mile features:* | 1 |
| *Community Anchor Institutions reported:* | 0 |

### *Time Warner Cable (TWC)*

TWC provided Geospatial data in the form of road centerlines and 2010 census blocks < 2 square miles. The provider also included a document stating that no middle mile data had changed; and, subscriber- weighted nominal speed would be sent as soon as it was available.

The TWC data included only one transmission technology type for the fall 2012 submission. Working in the provider staging database, census blocks < 2 square miles were joined to the Selection Set Census block data using the FIPS number text fields. The joined block data was output to a new feature class. Fields were calculated in the selection set export to match Time Warner fields and then the feature class was loaded into the NTIA transfer data model.

In order to provide the road centerline data in Virginia's geometry, the road lines provided by Time Warner were used in a select by location analysis. The Virginia Road Centerline Selection set was selected if the lines provided by Time Warner were within 5 meters and then exported to a new feature class. The values for all road segments by Time Warner were the same (Max Advertised Down =9, Max Advertised Up = 5) so values from the selection road centerline set were manually calculated to match the provided roads. This iteration of the roads was loaded into the NTIA transfer data model.

| | |
|---|---|
| *Provider Name:* | Time Warner Cable, LLC |
| *DBA Name:* | Time Warner Cable |
| *FRN:* | 0013430244 |
| *Transmission Technology* | 40 |
| *Wireless Polygons:* | 0 |
| *2010 Census Blocks <2 Square miles:* | 3,361 |
| *Address Point features:* | 0 |
| *Road Centerline features:* | 1,798 |
| *Middle Mile features:* | 0 |
| *Community Anchor Institutions reported:* | 0 |

### *Verizon Wireless*

Verizon Wireless provided two service area coverage shape files and sent the associated broadband attributes in an email. No middle mile carry over or subscriber-weighted nominal speed data was submitted. Each shape file contained a different footprint, one of Verizon's 4G LTE area and the second of their 3G area.

The shape files were imported into a staging database. A merge was performed in each file as each contained multiple polygons with identical attributes resulting in a single polygon for 3G and one for 4G. Fields were created in the 4G shape file to match the NTIA BB_Service_Wireless feature class document. The 4G shape file and the 3G Shapefile were then loaded to the VGIN NTIA transfer database.

Attributes were populated in the VGIN NTIA transfer database using the email attribute information with each of the 3G records having a different spectrum. The final geometry was three stacked polygons for the 3G coverage area and one polygon for the 4G area.

| | |
|---|---|
| *Provider Name:* | Cellco Partnership and its Affiliated Entities |
| *DBA Name:* | Verizon Wireless |
| *FRN:* | 0003290673 |
| *Transmission Technology* | 80 |
| *Wireless Polygons:* | 4 |
| *2010 Census Blocks <2 Square miles:* | 0 |
| *Address Point features:* | 0 |
| *Road Centerline features:* | 0 |
| *Middle Mile features:* | 0 |
| *Community Anchor Institutions reported:* | 0 |

### *Verizon Wireline*

Verizon Wireline provided text files for census block availability, address range availability with TLID. No Middle Mile information was supplied, and was carried over from the previous submission. The text files were exported to dbf and respectively joined to Census Blocks (by full FIPS) or to TIGER lines (by TLID). This was done as a separate process by a selection of each Technology type – this approach was used, as in previous deliveries, to ensure features with multiple Technology types were appropriately duplicated in the resulting data. The joins were exported to new feature classes and values were calculated based on joined features, and then remerged into a single feature class to complete the process. Blocks were then verified for appropriate square mileage (per the source projection), and the TIGER joins were output to new feature classes and they were used in a select by location analysis against the VGIN street segments. The blocks less than two square miles and (selection based) conflated road segments falling outside blocks less than two square miles were then loaded to the NTIA transfer data model.

| | |
|---|---|
| *Provider Name:* | Verizon Virginia Inc. |
| *DBA Name:* | Verizon Virginia Inc. |
| *FRN:* | 0002073203 |
| *Transmission Technology* | 10, 50 |
| *Wireless Polygons:* | 0 |
| *2010 Census Blocks <2 Square miles:* | 111,199 |
| *Address Point features:* | 0 |
| *Road Centerline features:* | 15,403 |
| *Middle Mile features:* | 12 |
| *Community Anchor Institutions reported:* | 0 |

### *ViaSat*

ViaSat Communications Inc. is a satellite provider and sent Geospatial data in the form of a coverage area shape file to represent its coverage of their Exede 12 product. A staging geodatabase was created to calculate attributes for polygons that were included and excluded by this provider.

There are several areas of the Commonwealth of Virginia that are not covered by Excede 12 yet are covered with the Exede 5 product so a separate polygon of the entire state was added to the providers staging data. Attributes for all pertinent features were populated to match the original shape file as well as additional fields needed in the NTIA database which were not present. The data was then loaded to the NTIA Transfer data model.

| | |
|---|---|
| *Provider Name:* | ViaSat Communications Inc. |
| *DBA Name:* | ViaSat Inc. |
| *FRN:* | 0007843766 |

| | |
|---|---|
| *Transmission Technology* | 60 |
| *Wireless Polygons:* | 1 |
| *2010 Census Blocks <2 Square miles:* | 0 |
| *Address Point features:* | 0 |
| *Road Centerline features:* | 0 |
| *Middle Mile features:* | 0 |
| *Community Anchor Institutions reported:* | 0 |

### *VSAT Systems, LLC.*

VSAT Systems, LLC. (DBA: Skycasters) provided geospatial data in a single coverage area shapefile for the state of Virginia. A state of Virginia polygon was copied and applied to the data. The attributes from the file were edited to match the data submitted by the provider.

| | |
|---|---|
| *Provider Name:* | VSAT Systems, LLC. |
| *DBA Name:* | Skycasters |
| *FRN:* | 0001875615 |
| *Transmission Technology* | 60 |
| *Wireless Polygons:* | 1 |
| *2010 Census Blocks <2 Square miles:* | 0 |
| *Address Point features:* | 0 |
| *Road Centerline features:* | 0 |
| *Middle Mile features:* | 0 |
| *Community Anchor Institutions reported:* | 0 |

### *XO Communications*

XO Communications last submitted data in the spring of 2010 in the form of a census block spreadsheet. The provider was recently contacted to confirm the status of their data and found no changes and additions had been made in the intervening years.

The data was reviewed and it was discovered that one census block was greater than 2 square miles. XO provided an address for the customer within that census block. The address was geocoded to the VGIN RCL locator to select a road segment. The selected road segment was spatially joined to the road feature class in the VGIN Selection data model and then exported to a separate feature class. Road attributes were populated and the data was loaded to the VGIN Transfer data model.

The census blocks from the 2010 submittal were imported to the staging database and the census block greater than 2 square miles was deleted. The census block data was then loaded to the VGIN Transfer data model.

| | |
|---|---|
| *Provider Name:* | XO Communications LLC |
| *DBA Name:* | XO Communications Services Inc |

| | |
|---|---|
| *FRN:* | 0006275945 |
| *Transmission Technology* | 10, 20, 30 |
| *Wireless Polygons:* | 0 |
| *2010 Census Blocks <2 Square miles:* | 1206 |
| *Address Point features:* | 0 |
| *Road Centerline features:* | 1 |
| *Middle Mile features:* | 0 |
| *Community Anchor Institutions reported:* | 0 |

### *Carryover Providers from Spring 2012*

Many providers did not submit updates for the Fall 2012 so their data from the Spring 2012 SBDD transfer model was carried over. A new staging geodatabase was created which represented providers who did not send updates and the schema matched the transfer data model. Providers who did not submit an update were selected by FRN from the Spring 2012 NTIA SBDD submittal.

Several providers that did not send updates for the Fall 2012 submission were reworked to meet the NTIA data model definition of broadband availability. They were reprocessed for data accuracy purposes.

The following broadband providers are participants in the VA SBDD project but did not indicate having updates:

| Broadband Provider | FCC Registration Number |
|---|---|
| BVU OptiNet | 0006823991 |
| Buggs Island Telephone Cooperative | 0002031698 |
| Citizens Cablevision Inc. | 0009485343 |
| Citizens Telephone Cooperative | 0004381422 |
| FairPoint Communications | 0002071116 |
| Level 3 Communications | 0003723822 |
| Mid Atlantic Broadband Cooperative | 0019765304 |
| Nelson Cable | 0000900287 |
| New Hope Telephone Cooperative | 0002071579 |
| Nextlink Wireless | 0014286934 |
| Roadstar Internet, Inc. | 0013445358 |
| Shentel Service Company | 0013393988 |
| Shentel Cable Company | 0018024075 |
| Sunset Digital Communications | 0000826322 |
| The Wired Road | 0020153854 |
| Virginia Mountain Micro | 0018713800 |
| XO Communications | 0006275945 |

The following broadband providers were reprocessed to match the NTIA data model:

***BVU***

BVU data was provided to Virginia before the NTIA deliveries but was carried over and used in the spring 2012 SBDD submission. After a quick review of BVU's data, it appeared the data was customer addresses only. The addresses were geocoded against the VGIN Address point locator and point results were used to extract census blocks. Blocks where an address fell within were selected and exported as a new feature class for loading to the NTIA data model.

All addresses outside of the blocks were then selected as well as unmatched addresses were then exported as a non-spatial table and re-geocoded to the VGIN Road Centerline address locator. These points were spatially joined to the selection road centerline feature and output to a new feature class.

Both the census block and road centerline feature classes were updated with BVU's information and then loaded into the transfer data model.

| | |
|---|---|
| *Provider Name:* | BVU |
| *DBA Name:* | OptiNet |
| *FRN:* | 0006823991 |
| *Transmission Technology* | 50 |
| *VA Data Category:* | 6 |
| *Wireless Polygons:* | 0 |
| *2010 Census Blocks <2 Square miles:* | 869 |
| *Address Point features:* | 0 |
| *Road Centerline features:* | 190 |
| *Middle Mile features:* | 0 |
| *Community Anchor Institutions reported:* | 0 |

***Citizens***

Citizens data was provided to Virginia before the NTIA SBDD project to include it's two FRN/provider name companies for DSL and cable and was carried forward and used in NTIA submissions due to its data type. The original Citizens submission was customer address information only along with a spreadsheet which showed speeds in relation to an access point using distance. For the first NTIA submission, a polygon data set was created which showed based on a buffer distance from the access point, the potential speeds a customer would receive based on address point location. This buffer polygon data was used in associating speed information to the data using the NTIA speed tiers. To date, Citizens has not submitted any additional updates to the NTIA project to include blocks less than two square miles or addresses / ranges outside of two square miles. Citizens has also not provided middle mile information.

The address spreadsheets for each FRN were geocoded against the VGIN Address point locator and point results were used to extract census blocks. Blocks where an address fell inside of were selected and exported as new feature classes for each FRN to be used in loading to the NTIA data model.

All addresses outside of the blocks for both spreadsheets were then selected as well as unmatched addresses were then exported as a non-spatial table and re-geocoded to the VGIN Road Centerline address locator. These points were spatially joined to the selection road centerline feature and output to a new feature class.

Both the census block and road centerline feature classes were updated with Citizens speed information based on the buffer polygon feature class in a select by location where the centerline or block feature's centroid fell within a buffer polygon. Information for Advertised and Typical download and upload speeds were used based location and were calculated within the staging database. The processed information was then loaded to the transfer data model.

| | |
|---|---|
| *Provider Name:* | Citizens Cablevision, Inc. |
| *DBA Name:* | Citizens |
| *FRN:* | 0009485343 |
| *Transmission Technology* | 41 |
| *Wireless Polygons:* | 0 |
| *2010 Census Blocks <2 Square miles:* | 120 |
| *Address Point features:* | 0 |
| *Road Centerline features:* | 61 |
| *Middle Mile features:* | 0 |
| *Community Anchor Institutions reported:* | 0 |

| | |
|---|---|
| *Provider Name:* | Citizens Telephone Cooperative |
| *DBA Name:* | Citizens |
| *FRN:* | 0004381422 |
| *Transmission Technology* | 10 |
| *Wireless Polygons:* | 0 |
| *2010 Census Blocks <2 Square miles:* | 703 |
| *Address Point features:* | 0 |
| *Road Centerline features:* | 441 |
| *Middle Mile features:* | 0 |
| *Community Anchor Institutions reported:* | 0 |

### *FairPoint Communications*

FairPoint Communications' data was provided to Virginia for the first round submission in the Spring 2010 to the NTIA. After a quick review of the data, it appeared the data was customer addresses only. The addresses were geocoded against the VGIN Address point locator and point results were used to extract census blocks. Blocks where an address fell inside were selected and exported as a new feature class for loading to the NTIA data model.

All addresses outside of the blocks were then selected as well as unmatched addresses were then exported as a non-spatial table and were re-geocoded to the VGIN Road Centerline address locator. These points were spatially joined to the selection road centerline feature and output to a new feature class. Centerlines were removed where they fell within blocks less than two square miles (caused by unmatched data in the Address Point geocode).

Both the census block and road centerline feature classes were updated with BVU's information and then loaded into the transfer data model.

| | |
|---|---|
| *Provider Name:* | Peoples Mutual Telephone Company |
| *DBA Name:* | FairPoint Communications |
| *FRN:* | 0002071116 |
| *Transmission Technology* | 10 |
| *Wireless Polygons:* | 0 |
| *2010 Census Blocks <2 Square miles:* | 860 |
| *Address Point features:* | 0 |
| *Road Centerline features:* | 88 |
| *Middle Mile features:* | 0 |
| *Community Anchor Institutions reported:* | 0 |

### *Mid-Atlantic Broadband Cooperative (MBC)*

MBC is a backbone provider and has 3 stimulus grants for build-out projects. They submitted middle mile data in a spreadsheet in the spring of 2012 which was processed and submitted in that round.

No data was received for this round so the data was carried over from the spring submittal and loaded to the VGIN Transfer data model.

| | |
|---|---|
| *Provider Name:* | Mid-Atlantic Broadband Cooperative |
| *DBA Name:* | MBC |
| *FRN:* | 0019765304 |
| *Transmission Technology* | |
| *Wireless Polygons:* | 0 |
| *2010 Census Blocks <2 Square miles:* | 0 |
| *Address Point features:* | 0 |
| *Road Centerline features:* | |
| *Middle Mile features:* | 22 |
| *Community Anchor Institutions reported:* | 0 |

### *Nelson Cable, Inc.*

Nelson Cable provided Virginia a list of census blocks for the first NTIA data submission as well as addresses. These blocks were evaluated when NTIA requested the 2000 census

blocks be converted to 2010 blocks. Address Points and centerlines were provided in archive releases.

The original block data was kept but for the Fall 2012 processing, gaps were filled in with the 2010 selection set census block data. Where addresses and Road Centerlines were available for blocks greater than two square miles in past NTIA SBDD releases, only centerlines were selected from the selection set Road centerline data for the Fall 2012 data.

Both Census Block and Road Centerline features were calculated for this provider using the last submission speed information and were loaded to the Transfer data model.

| | |
|---|---|
| *Provider Name:* | Wintergreen Community CableVision |
| *DBA Name:* | Nelson Cable, Inc. |
| *FRN:* | 0002071579 |
| *Transmission Technology* | 41 |
| *Wireless Polygons:* | 0 |
| *2010 Census Blocks <2 Square miles:* | 108 |
| *Address Point features:* | 0 |
| *Road Centerline features:* | 197 |
| *Middle Mile features:* | 0 |
| *Community Anchor Institutions reported:* | 0 |

***New Hope Telephone Company***

New Hope Telephone Company originally provided Virginia address range information for spring 2012. The address range information did not include segmentation based on TIGER streets or the VGIN RCL data set so there were many GIS features used to represent one record in the range information. Data was manually selected from the VGIN RCL to include all segments covered within the ranges that New Hope telephone cooperative service area could potentially cover. This data was provided to NTIA for several releases.

After evaluating the submitted centerline data, there were many census blocks less than two square miles which lay underneath the segmentation. A new Staging database was created for the Fall 2012 NTIA SBDD submission for New Hope Telephone Cooperative. Census blocks were selected where the carried over centerline data was within distance of 1 feet and of those selected, blocks were removed where a centerline was on the edge of a line. The final block selection was exported as a feature class and used for loading to the NTIA transfer data model. For the polygon edges, roads which were on boundaries were then selected from the centerlines. This was exported a new feature class used to load to the NTIA transfer model.

Both Census Block and Road Centerline features were calculated for this provider using the last submission speed information and were loaded to the Transfer data model.

| | |
|---|---|
| *Provider Name:* | New Hope Telephone Cooperative |
| *DBA Name:* | New Hope Telephone Cooperative |
| *FRN:* | 0002071579 |
| *Transmission Technology* | 10 |
| *Wireless Polygons:* | 0 |
| *2010 Census Blocks <2 Square miles:* | 985 |
| *Address Point features:* | 0 |
| *Road Centerline features:* | 31 |
| *Middle Mile features:* | 0 |
| *Community Anchor Institutions reported:* | 0 |

***Level 3 Communications***

Level 3 data was provided to Virginia for the Spring of 2011 submission. Their data was address level information as well as middle mile points so in order to reprocess the data for the Fall of 2012 release, a staging database was created and the addresses were geocoded against the VGIN Address point locator. Point results were used to extract census blocks. Blocks where a geocoded address result was located inside it were selected and exported as a new feature class for loading to the NTIA data model.

All addresses outside of the blocks as well as unmatched addresses were selected, exported to a new table, and were then re-geocoded to the VGIN Road Centerline address locator. The resulting points were spatially joined to the selection road centerline feature and output to a new feature class. Roads that were within distance of 1 foot to census blocks were removed from the reporting feature class and blocks were added to the census block feature class instead of the lines.

Both the census block and road centerline feature classes were updated with Level 3's information and then loaded into the transfer data model. Middle Mile points were carried over from the Spring 2012 submission and also loaded to the transfer data model.

| | |
|---|---|
| *Provider Name:* | Level 3 Communications, LLC |
| *DBA Name:* | Level 3 Communications, LLC |
| *FRN:* | 0006823991 |
| *Transmission Technology* | 50 |
| *Wireless Polygons:* | 0 |
| *2010 Census Blocks <2 Square miles:* | 560 |
| *Address Point features:* | 0 |
| *Road Centerline features:* | 10 |
| *Middle Mile features:* | 436 |
| *Community Anchor Institutions reported:* | 0 |

***Sunset Digital Communications Inc***

Sunset Digital was a first time provider for the fall 2011 SBDD submission and provided Geospatial data in the form of road centerlines and census blocks. The provider reported to CIT that the census Geography was in 2010 and VGIN provided them a road centerline data set for usage in reporting. Middle mile was included this round as text files although there may be potential to receive future middle mile submissions in a geospatial format. A new personal geodatabase was created to represent the staging of this provider for the fall 2011 release. Selection Set Feature Classes for Street Centerlines and Census blocks were used.

Census blocks less than two square miles were joined to the Selection Set Census block data using the FULLFIPSID text. Inspecting the join, all features seemed to successfully pass through, signifying that the provider did in fact submit data in 2010 geometry. The joined block data was output to new features. Since the data associated to the blocks were named similarly to the NITA model data, they were calculated in the selection set export and then into the NTIA transfer data model directly.

Sunset Digital provided road centerline segments to CIT and VGIN in the Virginia Road Centerline geometry. The submission data included the VA unique ID for road segments. The V_LEID was joined to the selection set road centerline data V_LEID and only matching records were used. After records were verified, a 100% match rate between the two data sets was achieved. Road centerlines were then output to a staging feature class and then calculated. The staging feature class was then loaded to the transfer data model.

Sunset Digital did not provide and new data for the Fall 2012 submission so the census block, road and middle mile data from the previous submission was loaded to the VGIN Transfer database.

| | |
|---|---|
| *Provider Name:* | Sunset Digital Communications Inc. |
| *DBA Name:* | Sunset Digital Communications Inc. |
| *FRN:* | 0000826322 |
| *Transmission Technology* | 50 |
| *VA Data Category:* | 1 |
| *Wireless Polygons:* | 0 |
| *2010 Census Blocks <2 Square miles:* | 1522 |
| *Address Point features:* | 0 |
| *Road Centerline features:* | 778 |
| *Middle Mile features:* | 20 |
| *Community Anchor Institutions reported:* | 0 |

## Post Processing Validation and Quality Control

The data included in the NTIA SBDD data model was quality controlled using the topology included in the model as well as the python script provided by NTIA. The topology was validated using ESRI ArcGIS Topology validation tools within ArcCatalog and no errors were reported.

The spring 2012 SBDD data submission was also quality controlled using the latest python script made available by NTIA on March 23, 2012. The script produced both warnings and failures and the data was scrubbed to correct as many as possible. A few items were noted and skipped due to inconsistencies in the NTIA GP check model as described in the March 23, 2012 conference call for all SBDD states with NTIA. The final run of the script resulted in speed tier warnings and failures which have been documented in detail in the READ ME_NTIA_SPRING_2012_SCRIPT_ERROS included in the data submittal.