

Colorado Broadband Data & Development Program

April 1, 2013 Data Delivery Report

For more information about the Colorado Broadband Data and Development Program (CBDDP), please see the websites below:

Colorado Broadband Data Development Program - www.colorado.gov/oit/broadband

National Broadband Map - www.broadbandmap.gov

Colorado Broadband Mapping Application - <http://maps.co.gov/ColoradoBroadband>

Purpose of this Report

The following report provides details about the data set delivered to the NTIA on April 1, 2013 to support the National Broadband Map and to meet the requirements of the State Broadband Data and Development Program grant to the Governor's Office of Information Technology (OIT). The report describes the various processes used to verify the data set and the results of those processes. It also describes, in general terms, how the CBDDP collects and validates information about broadband availability in the State of Colorado.

Status of Data Collection

The Colorado Broadband Data and Development Program data collection effort began with a third party contractor through a data collection contract signed on March 22, 2010. After the October 2011 data submission, the CBDDP data processing was brought in-house to the Governor's Office of Information Technology. For the April 2013 delivery, a search of current Providers in the state of Colorado was conducted by combining multiple outreach spreadsheets composed by the third party contractor from previous deliveries into a master list. The master list was then compared against our current Provider list, the FCC 477 and FCC 499. The purpose was to find current providers in Colorado, current contact information, and valid proof of broadband services (i.e. website). The master list consisted of more than 150 providers, not currently participating or previously contacted. Half of the providers identified provided only VOIP services, which are not currently included in broadband coverage, leaving 75 providers listed as providing broadband. Only 39 were found to have an active broadband footprint. Of the 39 providers found to be active within Colorado, 24 were interested in participating and submitted data; 2 of the provider's use dial-up or broadband services with speeds not meeting broadband requirements, and 13 providers were not interested in participating.

Since the October 2012 delivery OIT and the outreach efforts of the April 2013 data delivery, OIT contacted the 98 known service providers to contribute data toward the CBDDP, 74 of the Providers participated in previous deliveries. Of the 74 currently participating providers, 39 provided broadband coverage updates; 35 providers declared "no data change" from the last data submission. As outlined above, of the 39 newly identified active Providers from the master list, 24 providers agreed to participate and sent data; the remaining 15 providers were either non-responsive, would not provide data to the CBDDP, or did not meet broadband requirements.

The following table categorizes all possible broadband service providers in Colorado known to the CBDDP, and indicates the status of their participation in the program:

Service Providers	April 1, 2013
Potential Identified Providers	152
Data Sets Delivered to NTIA	98
Non Responsive Providers	13
Not a Broadband Provider	2
Will Not Provide Data	2
Out of Business	37

The following table describes service providers included in the current data delivery:

Service Provider Updates	April 1, 2013
New in Data Set	24
Updated Data	39
Responded "No Data Change"	35
Data Sets Delivered to NTIA	98

The CBDDP is very pleased with the progress that has been made in promoting speed tests among reporting CAIs. As shown below, 32% (or 1,662 of 5,226) of the data collected for CAIs is from speed tests. The CBDDP has not significantly expanded the number of CAIs submitting speed test information between October 2012 and the current delivery. However, with the hiring of new GIS and planning staff within OIT, we expect to make a more concerted effort to collect additional CAI information or update the data collected last year. The following table shows the number of community anchor institutions that have been identified in the state:

Community Anchor Institutions	April 1, 2013		
	Identified	Collected	Includes Speed Test
Cat. 1 - School K -12	2109	2082	974
Cat. 2 - Library	252	251	14
Cat. 3 - Medical/Healthcare	709	693	142
Cat. 4 - Public Safety	1779	1591	305
Cat. 5 - University/College	55	55	42
Cat. 6 - Other Government	601	546	179
Cat. 7 - Other non-Government	10	8	6
TOTALS	5515	5226	1662

Addresses and names that appear to be duplicates are validated. The CBDDP chooses to report multiple CAIs at the same address as distinct entities. For example, a county sheriff's office and a 911 call center at the same address are reported as two distinct entities.

Validation and Verification Processes for the April 2013 Data Set

Techniques:

1. Automated Validation
2. Analysis of Changes
3. Visual Review
4. Third Party Data Validation
5. Feedback Loop
6. CAI Speed Test Analysis
7. Drive Testing Mobile Coverage Areas
8. FCC Speed Test Validation
9. Crowd Sourcing

1. Automated Validation

The CBDDP has been developing and improving automated validation scripts since its first data delivery in May 2010. The CBDDP runs both the scripts it has developed as well as the script provided by the NTIA on a monthly basis. The data delivery includes documentation demonstrating that the data has passed the NTIA validation script as required.

In addition to testing all of the issues covered by the NTIA script, the CBDDP's automated script:

- Verifies that the Geodatabase has metadata, is in the correct projection, and that the feature classes are properly named
- Verifies all columns are properly named and defined
- Verifies all table value domains are adhered to
- Captures the required information to accurately complete the Records Count and Provider Table tabs for the SBDD Data Package
- Cross references and creates statistical tables of technology type and valid speed combinations for both Service Provider and CAI data
- Compares FCC assigned Frequency Reference Numbers (FRNs) to provider names to ensure consistency across the data set
- Ensures consistency in provider names
- Identifies possible duplicates among CAIs
- Tests all feature classes to ensure they are within the State's boundaries
- Creates a statistical table for all features classes including records details, service provider information and attribution frequencies
- Ensures the data model, business rules and schema are in compliance

2. Analysis of Changes

There are three major types of data changes between the October 2012 delivery and the April 2013 delivery: The addition of new providers; the transfer of broadband services between providers and receiving new data from existing providers. The coverage was updated to reflect the increase or decrease in service, with regards to the aforementioned data changes. The following table shows the percentage change in the number of features from October 2012 to April 2013:

	Census Blocks		Road Segments		Wireless Service		Middle Mile		Address Pts	
	Number of Providers	% Features Changed	Number of Providers	% Features Changed	Number of Providers	% Features Changed	Number of Providers	% Features Changed	Number of Providers	% Features Changed
New Providers	8	100%	6	100%	17	100%	16	100%	1	100%
Received new data	16	39%	17	7%	22	7%	26	2%	1	2%
Re-processed existing data	3	97%	2	6%	0	0%	1	4%	0	0%
No Changes	23	0%	21	0%	22	0%	17	0%	2	0%

3. Visual Review

The CBDDP also routinely reviews the coverage areas for new service providers and those with changes to their coverage areas as part of preparing data for delivery. We found no unusual coverage areas.

4. Third Party Data Validation

OIT compares service provider coverage areas to the following third party data sets: American Roamer, ComSearch, Pitney Bowes, MediaPrints, and SpectrumView. When compared, 20 providers overlapped multiple third party data sets, so in these cases all of the relevant third party data sets were used to validate a single service provider/technology type combination. The CBDDP records comments about coverage area, geometry, and attribution provided for the technology type, and assigns a categorical assessment of the match between the CBDDP data and each third party dataset. This assessment is necessarily subjective as the third party data sets are sometimes very crude in their spatial resolution, making it difficult to make precise comparisons.

5. Feedback Loop

As a routine part of the work flow, the CBDDP gave all service providers the opportunity to review the final geospatial representation of their data in the form of map books. In addition, the OIT team created validation assessments based on the tests described below and communicated results to providers for verification of speed accuracy within the provider coverage area.

6. CAI Speed Test Analysis

There are several issues to consider when comparing speed test data to service provider advertized maximum speeds. Many speed tests do not collect the name of the service provider being tested. In areas where more than one service provider offers varying maximum service speeds, it is not possible to know who is providing the service to the CAI. Also, if a speed test result is directly tied to a certain service provider, it is unknown if the customer has chosen to purchase the maximum available speed offered by the service provider.

The speed test information that the CBDDP collects from CAIs requests the name of the service provider, but of the 1,662 speed tests collected from CAIs, 1,048 of those tests specifically identified the service provider. The CBDDP uses all of the CAI speed tests, regardless of provider information because the test gives a more comprehensive perspective of the comparison between the speeds at each institution and the potential advertised service in their area.

The following table compares the speed tier for the CAI speed test to the maximum advertized speed tier by any service provider for that particular census block or blocks within 150 feet of the test. A similar test also compared the CAI tests to the minimum advertised speed by any providers that reported service in that area, and the table with these results is below as well.

CAI Speed Test Compared to Maximum Download speed by Census Block																	
	Speed Test Slower								Same Tier	Speed Test Faster							Total Tests
Number of Speed Tiers Slower or Faster	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	
School K - 12	5	19	70	95	171	124	340	77	8	11	0	0	0	0	0	0	920
Library	2	4	1	0	3	4	0	1	0	0	0	0	0	0	0	0	15
Healthcare	0	17	27	23	34	19	9	14	0	1	0	0	0	0	0	0	144
Public Safety	1	8	42	120	47	30	39	17	0	0	0	0	0	0	0	0	304
University, college	0	1	0	5	1	3	16	4	4	6	2	0	0	0	0	0	42
Other Government	1	5	27	30	25	23	51	12	0	0	0	0	0	0	0	0	174
Other Non-Government	0	1	1	1	3	0	0	0	0	0	0	0	0	0	0	0	6
Totals	9	55	168	274	284	203	455	125	12	18	2	0	0	0	0	0	1605
Totals	1573								12	20							1605

CAI Speed Test Compared to Minimum Download speed by Census Block																		
	Speed Test Slower									Same Tier	Speed Test Faster							Total Tests
Number of Speed Tiers Slower or Faster	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	
School K - 12	1	0	2	7	8	23	39	88	124	164	160	252	145	41	8	5	1	1068
Library	0	0	0	0	1	1	3	3	2	3	1	2	2	0	0	0	0	18
Healthcare	0	0	1	0	2	11	16	34	31	16	28	14	6	3	2	0	0	164
Public Safety	0	1	5	3	5	16	43	41	65	73	44	32	24	7	0	0	0	359
University, college	0	0	0	0	0	0	1	0	5	4	4	10	7	6	5	4	2	48
Other Government	0	0	3	3	5	12	40	20	27	43	24	14	20	7	0	0	0	218
Other Non-Government	0	1	0	0	0	0	0	2	0	2	1	0	0	0	0	0	0	6
Totals	1	2	11	13	21	63	142	188	254	305	262	324	204	64	15	9	3	1881
Totals	695									305	881							1881

7. Drive Testing Mobile Coverage Areas

The CBDDP tested the mobile wireless coverage areas reported by the service providers. The CBDDP completed drive testing for over 5,000 miles of roads over one year ago. These tests are still informative when compared to the current data from broadband service providers. The testing followed a test scheme starting with primary test points along major highways, followed by secondary points from one half to one mile away from the primary point to confirm the result of the primary test point. Tests continued until either four secondary points (beyond the primary points) were collected or until at least two of the secondary tests failed (with test speeds of less than 768 Kbps). The primary points were generally 10 to 15 miles apart, and the derived points were clustered

around the primary points within 2 to 3 miles. All tests used commercially available wireless air cards, identical laptops, and the same FCC speed test site. The tests checked only the major national mobile providers and were all performed between March and May of 2011.

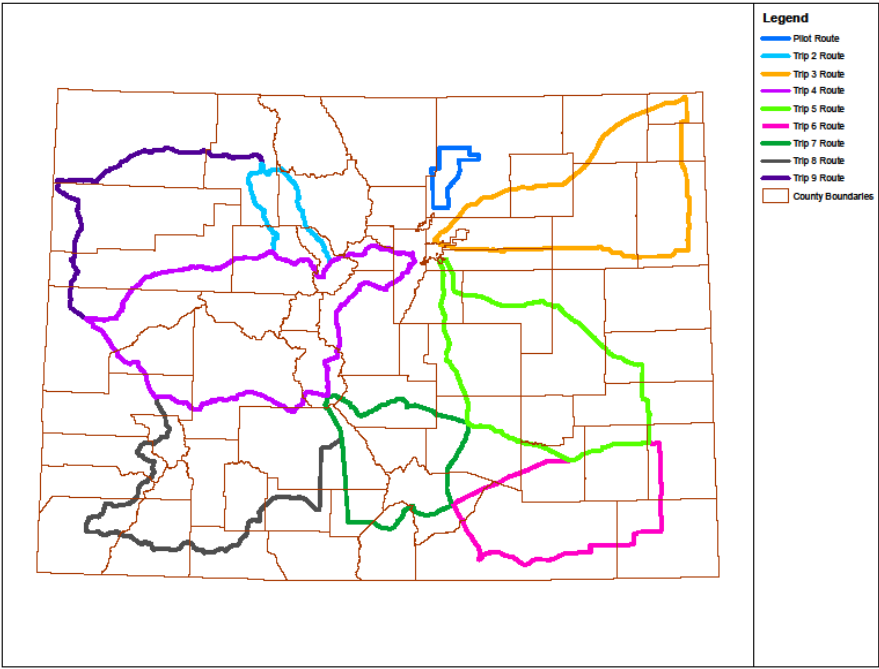


Figure 1: The following graphic is a general depiction of the routes used for the drive testing.

The following table presents the results of these drive tests. The number of test results shown for each provider reflects only the test points that fell within the coverage area submitted to the CBDDP by that service provider.

MOBILE WIRELESS COVERAGE TESTING										
All Points Tested Including Primary and Derived										
Combined Result for Three Providers Tested										
	Tiers Slower					Same Tier	Tiers Faster			Total Tests
<i>Number of Speed Tiers Slower or Faster</i>	< 768 Kbps	-4	-3	-2	-1	0	1	2	3	
	457	41	33	62	70	362	110	1	0	1136
Totals	663					362	111			1136
ATT										
	Tiers Slower					Same Tier	Tiers Faster			Total
<i>Number of Speed Tiers Slower or Faster</i>	< 768 Kbps	-4	-3	-2	-1	0	1	2	3	
	121	1	5	58	67	95	23	0	0	370
Totals	252					95	23			370
Sprint										
	Tiers Slower					Same Tier	Tiers Faster			Total
<i>Number of Speed Tiers Slower or Faster</i>	< 768 Kbps	-4	-3	-2	-1	0	1	2	3	
	143	0	0	4	3	163	23	1	0	332
Totals	150					163	24			337

Verizon										
	Tiers Slower					Same Tier	Tiers Faster			Total
Number of Speed Tiers Slower or Faster	< 768 Kbps	-4	-3	-2	-1	0	1	2	3	
	193	40	28	0	0	104	64	0	0	429
Totals	261					104	64			429

The CBDDP has had discussions with a private vendor of mobile speed testing services to obtain the data they've collected from their devices and application installed in vehicles of local agencies subscribing to their service, significantly increasing the magnitude of mobile speed tests.

8. FCC Speed Test Validation

The FCC speed test information contains two separate data sets: mobile speed tests and terrestrial/fixed wireless speed tests. Both data sets cover a date range from January 2012 to February 2013. The Consumer Broadband Test (CBT) data includes speed tests from homes, businesses, community centers, and other landline or fixed wireless locations. The FCC mobile data includes speed tests collected using the mobile app on a mobile device (i.e. iPhone or Android).

For validation of the FCC CBT speed tests, validation layers were created using census and roads coverage from the final SBDD_TRANSFER.gdb. A layer was created with the maximum available download speed, and a second layer consisted of the minimum available download speed. The census blocks were merged with overlapping buffered roads with same speed tier. The FCC CBT speed test points were then buffered by 150 feet and these buffers were compared to the merged census block and road layers described above.

The first two tables below compare the speed tier of the FCC CBT speed tests to the maximum and minimum advertised speed tiers reported by any non-mobile service provider at each location. The results of the table vary from the October 2012 submission because the previous submission included mobile speed tests which gave an inaccurate representation of FCC validation. The April 2013 FCC CBT validation results are shown below:

FCC CBT Data Speed Tests Compared to Maximum Download Speed																			
	Speed Test Slower								Same Tier	Speed Test Faster									Total Tests
Number of Speed Tiers Slower or Faster	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	
Maximum	92	212	171	432	470	976	536	198	145	62	33	6	8	0	0	0	0	0	3341
Totals	3087								145	109									3149
FCC CBT Data Speed Tests Compared to Minimum Download Speed																			
	Speed Test Slower								Same Tier	Speed Test Faster									Total Tests
Number of Speed Tiers Slower or Faster	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	
Minimum	0	6	8	21	51	151	266	336	444	515	769	661	225	31	6	0	0	0	3490
Totals	839								444	2207									3490

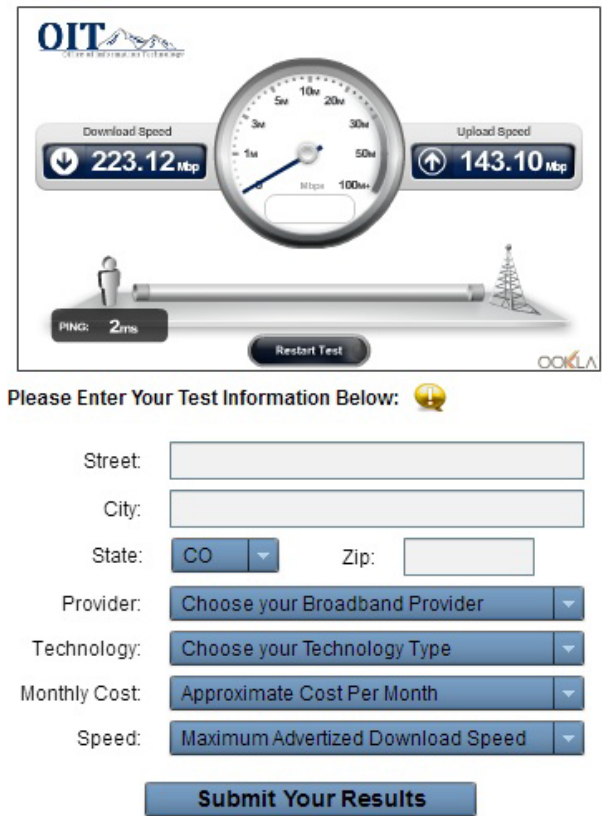
The FCC Mobile Data includes speed tests collected using the Mobile App on a mobile device (i.e. iPhone or Android). The FCC mobile speed tests compare mobile service providers maximum available download speed with the FCC speed tests from mobile providers. The speed test points were buffered 150 feet and a one-to-many join was conducted against all intersecting wireless coverage polygons. The composite table is a comparison of the maximum available download speed across all mobile providers. Tables following the composite are a breakdown by individual providers coverage: AT&T, Leap (Cricket), Nucla-Naturita, Sprint, T-Mobile, Verizon, and Viaero.

FCC Mobile Speed Tests compared to Mobile Services Providers															
	Speed Test Slower						Same Tier	Speed Test Faster							Total Tests
Number of Speed Tiers Slower or Faster	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	
Composite															
	1315	2044	1832	2363	2990	2105	3954	149	25	16	14	0	0	0	16807
Totals	12649						3954	204							16807
AT&T Inc.															
	780	1186	1562	2259	2637	2295	3390	849	1724	77	0	0	1	0	16760
Totals	10719						3390	2651							16760
Leap Wireless International, Inc.															
	0	0	0	0	1099	1740	1540	1998	2543	1738	3618	97	0	1	14374
Totals	2839						1540	9995							14374
Nucla-Naturita Telephone Company															
	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2
Totals	2						0	0							2
Sprint Nextel Corporation															
	0	0	697	1131	1709	2363	2680	2345	3566	915	1883	47	1	0	17337
Totals	5900						2680	8757							17337
T-Mobile USA, Inc.															
	1245	1861	1624	2211	2796	1936	3783	233	123	222	3	0	0	0	16037
Totals	11673						3783	581							16037
Verizon Wireless															
	1306	1999	1735	2234	2870	2080	4075	266	139	31	33	0	0	0	16768
Totals	12224						4075	469							16768
Viaero Wireless															
	4	25	21	11	18	5	1	0	0	0	0	0	0	0	85
Totals	84						1	0							85

9. Crowd Sourcing

Colorado broadband speed tests are collected in four ways: a public speed test application, a provider-only speed test application, a CAI speed test, and the Colorado Broadband Mapping Application. The public speed test is located in the CBDDP mapping application (<http://maps.co.gov/ColoradoBroadband>) and an image of the speed test

is shown below. A direct link speed test application also exists that can be placed on any website, which will help increase availability of the speed test and collect more results than the CBDDP mapping application alone.



Using the application, the general population can conduct speed tests from their home or office. The speed test is provided by an Ookla application, and results are given for download and upload speeds in Mbps. In addition to test results being collected, the user’s location, provider name, technology type, and monthly cost are also requested with the test results. The purpose is to collect reports of service from citizens and Community Anchor Institutions in order to compare against provider data. The speed tests are processed quarterly and included in validation for individual providers.

The provider-only speed test application allows providers to submit speed tests during service calls or installations, at which time they are able to test the bandwidth unrestricted by the particular service level subscribed to by the customer. The CBDDP is continuing efforts to collect speed tests using the aforementioned methods, which are used to compare against provider data.

Provider validation efforts continue to improve. For the April 2013 data delivery, the CBDDP used speed tests from the FCC, CAI’s, drive tests, public speed test application, and the provider speed test application. Validation against mobile provider coverage uses drive tests and FCC Mobile speed tests points, while validation for wireline and fixed wireless provider coverage uses FCC, CAI’s, public, and provider speed tests.

Summary of Process

The CBDDP follows the data collection process outlined on the National Broadband Map website: <http://www.broadbandmap.gov/about/technical-overview>. A more detailed description of the data processing methods is provided in the Process Guide, which is included with the data submission (CO_Process_Guide_2013_4_01.pdf).

During the first two years of the program, the CBDDP contracted a third party business (Critigen) to perform data processing. Starting with the April 1, 2012 delivery, the CBDDP hired staff and brought this process in-house. The CBDDP will continue with in-house staff through the remainder of the program to October 31, 2014. In-sourcing has improved data quality and increased the number of providers reporting in comparison to previous deliveries. The CBDDP has implemented the following process, which may vary from other state programs.

Data Collection

1. The data gathering process begins by identifying and contacting potential broadband providers. Participation in the program is voluntary, but many providers choose to support our effort.
2. The CBDDP reaches out to providers who have not previously submitted data, in order to create a more comprehensive state dataset.
3. The CBDDP also contacts each currently participating provider to allow them to report data changes or confirm the existing data is still accurate.
4. The CBDDP works closely with providers to help find the best and most accurate method to submit data. We encourage a uniform data submission across all providers, but accept data in various formats dependent on the provider's software limitations.

Data Processing

1. Reference layers include the U.S. Census Bureau 2010 TIGER/Line Shapefile with Census Blocks and Roads.
2. Landline data is divided into three separate categories: census blocks less than two square miles, census blocks greater than two square miles, and service address points
 - For census blocks less than two square miles, the entire census block is presumed to have coverage if a service provider reports broadband service within that census block.
 - For census blocks greater than two square miles, the CBDDP reports service along road segments.
 - Service addresses represent providers who provide service to specific business locations or CAIs, but do not advertise or provide service to residences.
3. When receiving new or updated Provider coverage, data is often submitted as address or point specific information, in which case a 150 foot buffer is drawn around each point and the resulting coverage is used to select the appropriate census blocks and road segments. The CBDDP also implements a network analysis to transform DSLAM (digital subscriber line access multiplexer) locations into a service network area, which is then used to spatially select Census Blocks and Road Segments. The data submitted by the provider is used to collect census blocks and road segments from the reference layers (U.S. Census Bureau 2010 TIGER/Line Shapefile).
4. Wireless data submitted as a service coverage area is added directly to the provider coverage.
5. Wireless data submitted as tower locations is processed using signal propagation software to create a coverage plot.
6. Middle mile locations are reported by the providers using either addresses or coordinates. Central office locations and wireless towers are included in the BB_ConnectionPoint_MiddleMile.
7. Representing typical speeds continues to be an issue, as less than two thirds of the providers report typical speed information.
8. Based on clarifications from the NTIA, the CBDDP did not provide any features in the BB_Service_Overview feature class as more granular speed information was provided in the BB_Service_CensusBlock, BB_Service_RoadSegment and BB_Service_Address feature classes.
9. The CBDDP is not currently collecting pricing information.
10. Various validation methods are implemented to check the data accuracy, as described in "Validation and Verification" section of this document.

Data Submission

1. Before submitting data to the NTIA, the CBDDP compiles the data from each provider into a single dataset using the data model specified by the NTIA.
2. The NTIA then integrates the CBDDP's dataset into the National Broadband Map dataset.

Data Summary and Feature Class Statistical Tables

File Summary									
File Type				Number of Records					
Total Records in all Files				644164					
Census Block < 2 sq. miles				458343					
Street Segments				176549					
Wireless Areas				93					
Service Address				1247					
BB Service Overview				0					
Community Anchor Institutions				5515					
Middle Mile				2417					
Metadata Provided for Geospatial Data				Yes					
Provider Information									
File Type				Number of Records					
Number of ISPs Provided				98					

Census Blocks < 2 sq. miles

Data Type	Code	Data Element	Count	%	Data Type	Code	Data Element	Count	%
Records Details		Total Records	458343		Typical Download Speed	3	>= 768 kbps. < 1.5 mbps.	8411	1.8%
		Census Blocks < 2 sq. miles in State (with & without broadband)	192101			4	>= 1.5 mbps. < 3 mbps.	39361	8.6%
		Census Blocks > 2 sq. miles in the State (with & without broadband)	8961			Wired	>= 3 mbps. < 6 mbps.	101806	22.2%
		Total Census Blocks in the State (with & without broadband)	201062			6	>= 6 mbps. < 10 mbps.	49745	10.9%
						7	>= 10 mbps. < 25 mbps.	78346	17.1%
Services Provider Details		Number of Distinct Providers	51			8	>= 25 mbps. < 50 mbps.	33655	7.3%
		Number of Distinct "Doing Business As"	49			9	> 50 mbps, < 100 mbps.	46	0.0%
		Number of Distinct FRN	52			10	> 100 mbps, < 1 gbps.	23	0.0%
Technology	10	Asymmetric xDSL	181615	39.6%		11	> 1 gbps.	0	0.0%
	20	Symmetric xDSL	60491	13.2%		ZZ "null"		146950	32.1%
	30	Other Copper Wireless	78211	17.1%	Max. Advertised Upload Speed	2	>200 kps, < 768 kps.	24781	5.4%
	40	Cable Modem-DOCSIS 3.0	58956	12.9%		3	>= 768 kbps. < 1.5 mbps.	95799	20.9%
	41	Cable Modem-Other	27132	5.9%		4	> 1.5 mbps, < 3 mbps.	81929	17.9%
	50	Optical Carrier/Fiber	51938	11.3%		5	> 3 mbps, < 6 mbps.	104805	22.9%
	60	Satellite	0	0.0%		6	> 6 mbps, < 10 mbps.	45189	9.9%
	70	Terrestrial Fixed Wireless-Unlicensed	0	0.0%		7	> 10 mbps, < 25 mbps.	95283	20.8%
	71	Terrestrial Fixed Wireless-Licensed	0	0.0%		8	> 25 mbps, < 50 mbps.	4126	0.9%
	80	Terrestrial Mobile Wireless	0	0.0%		9	> 50 mbps, < 100 mbps.	6129	1.3%
	90	Electrial Power Line	0	0.0%		10	> 100 mbps, < 1 gbps.	266	0.1%
	0	Other	0	0.0%		11	> 1 gbps.	36	0.0%
Max. Advertised Download Speed	3	> 768 kps, < 1.5 mbps.	8895	1.9%	Typical Upload Speed	2	>200 kps, < 768 kps.	39127	8.5%
	4	> 1.5 mbps, < 3 mbps.	52516	11.5%		3	> 768 kps, < 1.5 mbps.	56085	12.2%
	5	> 3 mbps, < 6 mbps.	111741	24.4%		4	> 1.5 mbps, < 3 mbps.	64785	14.1%
	6	> 6 mbps, < 10 mbps.	72629	15.8%		5	> 3 mbps, < 6 mbps.	83502	18.2%
	7	> 10 mbps, < 25 mbps.	105803	23.1%		6	> 6 mbps, < 10 mbps.	41420	9.0%
	8	> 25 mbps, < 50 mbps.	35749	7.8%		7	> 10 mbps, < 25 mbps.	24552	5.4%
	9	> 50 mbps, < 100 mbps.	9333	2.0%		8	> 25 mbps, < 50 mbps.	1899	0.4%
	10	> 100 mbps, < 1 gbps.	61641	13.4%		9	> 50 mbps, < 100 mbps.	23	0.0%
	11	> 1 gbps.	36	0.0%		10	> 100 mbps, < 1 gbps.	0	0.0%
						11	> 1 gbps.	0	0.0%
						ZZ "null"		146950	32.1%
Provider Type	1	Provider	458343	100%					
	2	Reseller	0	0.0%					
End User Name	1	Residential	456184	99.5%					
	2	Governmental	2159	0.5%					

Street Segment

Data Type	Code	Data Element	Count	%	Data Type	Code	Data Element	Count	%
Record Details		Total Records	176549		Typical Download Speed	3	> 768 kps, < 1.5 mbps.	3921	2.2%
Services Provider Details		Number of Distinct Providers	46			4	> 1.5 mbps, < 3 mbps.	26414	15.0%
		Number of Distinct "Doing Business As"	45			5	> 3 mbps, < 6 mbps.	12077	6.8%
		Number of Distinct FRN	47			6	> 6 mbps, < 10 mbps.	18354	10.4%
						7	> 10 mbps, < 25 mbps.	29309	16.6%
Technology	10	Asymmetric xDSL	86194	48.8%		8	> 25 mbps, < 50 mbps.	1279	0.7%
	20	Symmetric xDSL	15545	8.8%		9	> 50 mbps, < 100 mbps.	0	0.0%
	30	Other Copper Wireless	6798	3.9%		10	> 100 mbps, < 1 gbps.	2	0.0%
	40	Cable Modem-DOCSIS 3.0	13478	7.6%		11	> 1 gbps.	0	0.0%
	41	Cable Modem-Other	21097	11.9%		ZZ "null"		85193	48.3%
	50	Optical Carrier/Fiber	33437	18.9%	Max. Advertised Upload Speed	2	>200 kps, < 768 kps.	28691	16.3%
	60	Satellite	0	0.0%		3	> 768 kps, < 1.5 mbps.	38953	22.1%
	70	Terrestrial Fixed Wireless-Unlicensed	0	0.0%		4	> 1.5 mbps, < 3 mbps.	40487	22.9%
	71	Terrestrial Fixed Wireless-Licensed	0	0.0%		5	> 3 mbps, < 6 mbps.	16989	9.6%
	80	Terrestrial Mobile Wireless	0	0.0%		6	> 6 mbps, < 10 mbps.	26612	15.1%
	90	Electrial Power Line	0	0.0%		7	> 10 mbps, < 25 mbps.	19785	11.2%
	0	Other	0	0.0%		8	> 25 mbps, < 50 mbps.	4920	2.8%
Max. Advertised Download Speed	3	> 768 kps, < 1.5 mbps.	15862	9.0%		9	> 50 mbps, < 100 mbps.	111	0.1%
	4	> 1.5 mbps, < 3 mbps.	38165	21.6%		10	> 100 mbps, < 1 gbps.	1	0.0%
	5	> 3 mbps, < 6 mbps.	19565	11.1%		11	> 1 gbps.	0	0.0%
	6	> 6 mbps, < 10 mbps.	30164	17.1%	Typical Upload Speed	2	>200 kps, < 768 kps.	24241	13.7%
	7	> 10 mbps, < 25 mbps.	48937	27.7%		3	> 768 kps, < 1.5 mbps.	20294	11.5%
	8	> 25 mbps, < 50 mbps.	5708	3.2%		4	> 1.5 mbps, < 3 mbps.	25605	14.5%
	9	> 50 mbps, < 100 mbps.	4707	2.7%		5	> 3 mbps, < 6 mbps.	5029	2.8%
	10	> 100 mbps, < 1 gbps.	13441	7.6%		6	> 6 mbps, < 10 mbps.	15200	8.6%
	11	> 1 gbps.	0	0.0%		7	> 10 mbps, < 25 mbps.	985	0.6%
Provider Type	1	Provider	176549	100.0%		8	> 25 mbps, < 50 mbps.	0	0.0%
	2	Reseller	0	0.0%		9	> 50 mbps, < 100 mbps.	2	0.0%
End User Name	1	Residential	176491	100.0%		10	> 100 mbps, < 1 gbps.	0	0.0%
	2	Governmental	58	0.0%		11	> 1 gbps.	0	0.0%
							ZZ "null"	85193	48.3%

Wireless

Data Type	Code	Data Element	Count	%	Data Type	Code	Data Element	Count	%
Record Details		Total Records	93		Typical Download Speed	2	>200 kps, < 768 kps.	0	0.0%
Services Provider Details		Number of Distinct Providers	62			3	> 768 kps, < 1.5 mbps.	17	22.8%
		Number of Distinct "Doing Business As"	60			4	> 1.5 mbps, < 3 mbps.	6	10.5%
		Number of Distinct FRN	57			5	> 3 mbps, < 6 mbps.	13	22.8%
						6	> 6 mbps, < 10 mbps.	10	7.0%
Technology	10	Asymmetric xDSL	0	0.0%		7	> 10 mbps, < 25 mbps.	3	0.0%
	20	Symmetric xDSL	0	0.0%		8	> 25 mbps, < 50 mbps.	0	0.0%
	30	Other Copper Wireless	0	0.0%		9	> 50 mbps, < 100 mbps.	0	0.0%
	40	Cable Modem-DOCSIS 3.0	0	0.0%		10	> 100 mbps, < 1 gbps.	0	0.0%
	41	Cable Modem-Other	0	0.0%			ZZ "null"	44	36.8%
	50	Optical Carrier/Fiber	0	0.0%	Max. Advertised Upload Speed	2	>200 kps, < 768 kps.	15	29.8%
	60	Satellite	5	0.0%		3	> 768 kps, < 1.5 mbps.	27	35.1%
	70	Terrestrial Fixed Wireless-Unlicensed	49	42.1%		4	> 1.5 mbps, < 3 mbps.	18	14.0%
	71	Terrestrial Fixed Wireless-Licensed	20	29.8%		5	> 3 mbps, < 6 mbps.	12	14.0%
	80	Terrestrial Mobile Wireless	19	28.1%		6	> 6 mbps, < 10 mbps.	8	7.0%
	90	Electrial Power Line	0	0.0%		7	> 10 mbps, < 25 mbps.	13	0.0%
	0	Other	0	0.0%		8	> 25 mbps, < 50 mbps.	0	0.0%
Max. Advertised Download Speed	3	> 768 kps, < 1.5 mbps.	15	24.6%		9	> 50 mbps, < 100 mbps.	0	0.0%
	4	> 1.5 mbps, < 3 mbps.	10	17.5%		10	> 100 mbps, < 1 gbps.	0	0.0%
	5	> 3 mbps, < 6 mbps.	21	33.3%		11	> 1 gbps.	0	0.0%
	6	> 6 mbps, < 10 mbps.	22	24.6%	Typical Upload Speed	2	>200 kps, < 768 kps.	15	19.3%
	7	> 10 mbps, < 25 mbps.	25	0.0%		3	> 768 kps, < 1.5 mbps.	20	33.3%
	8	> 25 mbps, < 50 mbps.	0	0.0%		4	> 1.5 mbps, < 3 mbps.	5	3.5%
	9	> 50 mbps, < 100 mbps.	0	0.0%		5	> 3 mbps, < 6 mbps.	4	5.3%
	10	> 100 mbps, < 1 gbps.	0	0.0%		6	> 6 mbps, < 10 mbps.	2	1.8%
	11	> 1 gbps.	0	0.0%		7	> 10 mbps, < 25 mbps.	3	0.0%
Spectrum	1	800 Mhz Spectrum Used	3	3.5%		8	> 25 mbps, < 50 mbps.	0	0.0%
	2	700 Mhz Spectrum Used	8	12.3%		9	> 50 mbps, < 100 mbps.	0	0.0%
	3	1900 Mhz Spectrum Used	6	8.8%		10	> 100 mbps, < 1 gbps.	0	0.0%
	4	1700 Mhz Spectrum Used	7	10.5%			ZZ "null"	44	36.8%
	5	2500 Mhz Spectrum Used	5	7.0%					
	6	Unlicensed Spectrum Used	51	49.1%					
	7	Specialist Mobile Radio Service	4	8.8%					
	8	Wireless Communication Service	4	0.0%					
	9	Satellite	5	0.0%					

Community Anchor Institution

Data Type					Data Type				
Code		Data Element	Count	%	Code		Data Element	Count	%
Record Details		Total Records	5515		Max. Advertised Upload Speed	1	< 200 kps.	0	0.0%
				2		>200 kps, < 768 kps.	214	3.9%	
Anchor Category	1	School-K through 12	2109	38.2%		3	> 768 kps, < 1.5 mbps.	666	12.1%
	2	Library	252	4.6%		4	> 1.5 mbps, < 3 mbps.	1806	32.7%
	3	Medical/healthcare	709	12.9%		5	> 3 mbps, < 6 mbps.	1029	18.7%
	4	Public safety	1779	32.3%		6	> 6 mbps, < 10 mbps.	446	8.1%
	5	University, college, other post-secondary	55	1.0%		7	> 10 mbps, < 25 mbps.	782	14.2%
	6	Other community support-/gov't	601	10.9%		8	> 25 mbps, < 50 mbps.	97	1.8%
	7	Other community support-non-/gov't	10	0.2%		9	> 50 mbps, < 100 mbps.	53	1.0%
				10		> 100 mbps, < 1 gbps.	61	1.1%	
Technology	10	Asymmetric xDSL	1216	22.0%		11	> 1 gbps.	72	1.3%
	20	Symmetric xDSL	20	0.4%			ZZ "null"	289	5.2%
	30	Other Copper Wireless	1934	35.1%		Y/N Broadband Service	Y	Yes-Subscribers to Service	5226
	40	Cable Modem-DOCSIS 3.0	5	0.1%	N		No-Does Not Subscribers to Service	289	5.2%
	41	Cable Modem-Other	146	2.6%	U		Unknown	0	0.0%
	50	Optical Carrier/Fiber	1787	32.4%	Lat/Long Accuracy	1	Lat/Long thT Flls within the State	5515	
	60	Satellite	14	0.3%		2	Total Lat/Long	5515	100%
	70	Terrestrial Fixed Wireless-Unlicensed	27	0.5%	Anchor Names	Total Count Anchors Names		5515	
	71	Terrestrial Fixed Wireless-Licensed	77	1.4%		Disticnt Count of Anchor Names		5368	
	80	Terrestrial Mobile Wireless	0	0.0%					
	90	Electrial Power Line	0	0.0%					
	0	Other	0	0.0%					
		ZZ "null"	289	5.2%					
								Count	BB Info
Max. Advertised Download Speed	1	< 200 kps.	0	0.0%	Community Anchor Institution Category Count with Broadband Information	1	School-K through 12	2109	2082
	2	>200 kps, < 768 kps.	0	0.0%		2	Library	252	251
	3	> 768 kps, < 1.5 mbps.	231	4.2%		3	Medical/healthcare	709	693
	4	> 1.5 mbps, < 3 mbps.	1707	31.0%		4	Public safety	1779	1591
	5	> 3 mbps, < 6 mbps.	992	18.0%		5	University, college, other post-secondary	55	55
	6	> 6 mbps, < 10 mbps.	433	7.9%		6	Other community support-/gov't	601	546
	7	> 10 mbps, < 25 mbps.	1430	25.9%		7	Other community support-non-/gov't	10	8
	8	> 25 mbps, < 50 mbps.	213	3.9%			Totals	5515	5226
	9	> 50 mbps, < 100 mbps.	67	1.2%					
	10	> 100 mbps, < 1 gbps.	81	1.5%	Public WIFI	1	Y	0	
	11	> 1 gbps.	72	1.3%		2	N	5515	
		ZZ "null"	289	5.2%					

Middle Mile

Data Type	Code	Data Element	Count	%	Data Type	Code	Data Element	Count	%
Record Details		Total Records	2417		Facility Type	1	Fiber	1473	60.9%
						2	Copper	4	0.2%
Services Provider Details		Number of Distinct Providers	60			3	Hybrid Fiber Coax (HFC)	3	0.1%
		Number of Distinct "Doing Business As"	57			4	Wireless	937	38.8%
		Number of Distinct FRN	56				N/A "null"		0.0%
Ownership	0	Owned	1467	60.7%	Lat / Long		# of Lat/Long in State	1151	100%
	1	Leased	950	39.3%			Total Lat/Long	1151	
Facility Capacity	1	Multiple T1's and less than 40 mbps.	816	33.8%	Elevation		Number of Data Points	634	
	2	Greater than 40 mbps. and less than 150 mbps.	173	7.2%			Lowest Elevation	5	
	3	Greater than 150 mbps. and less than 600 mbps.	110	4.6%			Highest Elevation	350	
	4	Greater than 600 mbps. and less than 2.4 gbps.	45	1.9%					
	5	Greater than 2.4 gbps. and less than 10 gbps.	0	0.0%					
	6	Greater than 10 gbps	1273	52.7%					

Services Providers				Census	Roads	Wireless	Mid Mile
#	Broadband Services Providers Submitted						
	FRN	Company Name	Doing Business As				
1	0004311627	Agate Mutual Telephone Cooperative Association	Prairie Networks, LLC	28	214		10
2	0003777927	Antilles Wireless, LLC	USA Communications	232		1	
3	0003766532	New Cingular Wireless Services, Inc	AT&T Corp, Inc.			5	1
4	0014860522	Baja Broadband Holding Company	Baja Broadband Operating Company, LLC	3201	280		
5	0003728292	Beulahland Communications, Inc.,	Beulahland Communications, Inc.,			2	1
6	0003723509	Big Sandy Telecom, Inc	Big Sandy Telecom, Inc	351	2039		18
7	0003754652	Bijou Telephone Co-op Association, Inc.	Bijou Telephone Cooperative Association, Inc.	1005	1082	2	4
8	0003766201	Blanca Telephone Company	Blanca Telephone Company	2922	3252		
9	0017108747	Brainstorm Internet	Brainstorm Internet			1	45
10	0014778781	BySky, Inc.	BySky, Inc.			1	
11	0006980866	Chase 3000, Inc.	Chase 3000, Inc.			1	2
12	0018589259	Cardinal Broadband, LLC	Cardinal Broadband, LLC	35			
13	0019746445	CAP Cable	USA Communications	628	5	1	
14	0018626853	CenturyTel, Inc.	CenturyTel, Inc.	94113	54877		
15	0001621127	City of Glenwood Springs	City of Glenwood Springs, Community Broadband Network	110	1	1	
16	0017775628	Clear Wireless, LLC	Clearwire			1	
17	0001614015	Colorado Mobile Inet, LLC	Colorado Mobile Inet, LLC			1	22
18	9999	Colorado Wireless Exchange Cooperative	Colorado Wireless Exchange Cooperative			1	3
19	0002147098	Columbine Telecom Company	FairPoint Communications	516	1646	1	20
20	0004441663	Comcast Cable Communications, LLC	Comcast	59384	13478		
21	0007001977	CSC Holdings, LLC	Bresnan Communications	15116	6354		
22	0001617281	Delta County Tele-comm, Inc.	TDS Telecom	827	844		1
23	0020233508	DirectLink, LLC	DirectLink, LLC			2	77
24	0017195017	Diverse Datum, Inc	Diverse Datum, Inc			1	28
25	0001629781	Dubois Telephone Exchange, Inc.,	DTE	53	130	1	4
26	0013339973	Eagle Communications, Inc.	Eagle Cable TV And Internet	237	29		1
27	0004317731	Eastern Slope Rural Telephone Association, Inc.	Eastern Slope Rural Telephone Association, Inc.	2220	7449		12
28	0020146056	Elevated Access LLC	Elevated Access LLC	23	1	3	5
29	0003767852	Eschelon Telecom of Colorado, Inc.	Integra Telecom	81750	20735		
30	0017509779	Estes Valley Networks, Inc.	Estes Valley Networks, Inc.			1	3
31	0019436757	Falcon Broadband, Inc	Falcon Broadband, Inc	276	12		
32	0004338489	Farmers Telephone Company	Farmers Telephone Company	180	921		12
33	0005059092	Farmers Telecommunications	Farmers Telecommunications	682	111	2	1
34	0007719719	FastTrack Communications, Inc	FastTrack Communications, Inc	10915	18179		
35	0015575285	Front Range Internet, Inc.	Front Range Internet, Inc.	5794	97		1
36	0016084683	Grand County Internet Services, Inc.	Grand County Internet Services, Inc.			1	34
37	0000824224	Grand Valley Telecommunications, Inc.	Grand Valley Telecommunications, Inc.	1171	10	1	7

38	0004381380	Great Plains Communications, Inc.	Great Plains Communications, Inc.	5	2		
39	0001616200	Haxtun Telephone	Haxtun	1023	1327		
40	0019794643	HighSpeed4U	HighSpeed4U			1	24
41	0018483073	Hughes Network Systems, LLC	HughesNet			1	
42	0015866460	Internet Colorado	Internet Colorado	364	54	1	12
43	0018706002	Inventive Wireless of Nebraska, LLC	Vistabeam			1	
44	0007651219	iLOKA Inc	Microtech-tel	35614	20380		
45	0014175673	JAB Broadband	Skybeam, Inc.			1	39 9
46	0003766623	Jade Communications, LLC	Jade Communications, LLC			1	16
47	0002748044	James Cable LLC	CommuniComm Services	692	3		1
48	0003728284	J.e.d. Enterprises, Inc.	J.e.d. Enterprises, Inc.	203	1355		16
49	0004671764	Kentec Communications Inc	Kentec Communications Inc	737	1791	1	35
50	9999	Kremmling Technology Services	Kremmling Technology Services			1	3
51	0005030200	Live Wire Networks, Inc.	Live Wire Networks, Inc.	293		1	
52	0003723822	Level 3 Communications, LLC	Level 3 Communications, LLC				41 8
53	0002963528	Leap Wireless International, Inc.	Cricket Communications, Inc.,			2	
54	0018769547	Magnolia Road Internet Coop	MRIC			2	20
55	0003753787	MegaPath Corporation MegaPath Corporation	MegaPath Corporation	12708 8	4713		3
56	0016631087	Mountain Computer Wizards, Inc.	Mountain Computer Wizards, Inc.			1	5
57	9999	Mountain Broadband, LLC	Mountain Broadband			1	18
58	0001610815	Mountain Village Cable TV	Mountain Village Owners Association	61			
59	9999	Nedernet, Inc.	Nedernet, Inc.			1	15
60	0004312187	Nucla-Naturita Telephone Company	Nucla-Naturita Telephone Company	297	332	2	
61	0004311809	Nunn Telephone Company	Nunn Commuicatio, LLC	398	1358		1
62	9999	OurayNet	OurayNet			1	13
63	0014699953	Peetz Communications, LLC	Peetz Cooperative Telephone Company	94	176	1	
64	0016286825	PCI Broadband	PCI Broadband			4	
65	0004314316	Phillips County Telephone Company	PCTelecom	585	757	2	3
66	0001615889	Plains Cooperative Telephone Association, Inc.,	Plains Cooperative Telephone Association, Inc.,	1113	3298	1	52
67	0011953643	Plains.Net	Premier Systems Unlimited, Inc			1	27
68	0016084675	Rebeltec Communications, LLC	Rebeltec Communications, LLC	91		2	26
69	0005059092	Rico Telephone Company	Rico Telephone Company	78	93		3
70	0014705602	Roggen Telephone Cooperative Company	Roggen Telephone Enterprises, Inc.			1	2
71	0001615665	Rye Telephone Company, Inc.	ghValley.net	894	2641	1	2
72	0005061775	San Isabel Telecom, Inc.	San Isabel Telecom, Inc.	1360	634	1	5
73	0004310769	S&T Telephone Coop Association. Inc.	S&T Telephone Coop Assoc Inc	22	29		
74	0016136327	SECOM	SECOM			2	28
75	0018756155	Skycasters, LLC	Skycasters			1	
76	9999	Skywerx Industries, LLC	Skywerx Industries, LLC			1	
77	0017163304	Slopeside Internet, LLC	Slopeside Internet, LLC			3	

78	0005070933	South Park Telephone Company, LLC	ghValley.net			2	1
79	0003774593	Sprint Nextel Corporation	Sprint			2	1
80	0005087457	StarBand Communications Inc.	StarBand Communications Inc.			1	
81	0015021066	Stelera Wireless, LLC	Stelera Wireless, LLC			1	28
82	0001616390	Strasburg Telephone Company	TDS Telecom	111	176		1
83	0003723236	Sunflower Telephone Company	FairPoint Communications	289	531		12
84	0006945950	T-Mobile USA, Inc.	T-Mobile			3	7
85	0013430244	Time Warner Cable	Time Warner Cable	925	859		
86	0004351086	tw telecom inc.	tw telecom inc.	1320	5		2
87	0005200067	Uintah Basin Electronic Telecommunications	Strata Networks	1358	467	1	
88	0003290673	Verizon Wireless	Verizon Wireless			4	
89	0015360456	Viaero Wireless	Viaero Wireless			1	
90	0007843766	ViaSat	ViaSat Communications			2	
91	0020647715	Vision Wireless Communications	Vision Wireless Communications			1	19
92	0001616192	Wiggins Telephone Association	Wiggins Telephone	720	3769		1
93	0006275945	XO Communications, LLC	XO Communications Services, Inc. (Affiliated Entity)	839	53		
94	0015331689	Zayo Enterprise Networks, LLC	Zayo Enterprise Networks, LLC				84 7
95	0018186395	Zero Error Networks, LLC	Zero Error Networks, LLC			1	19
96	0012579652	Zirkel Wireless, LLC	Zirkel Wireless, LLC			3	20
97	0019898303	Cogent Communications, Inc.	Cogent Communications, Inc.	43 Service Address			
98	0014817357	Unite Private Networks, LLC	Unite Private Networks	516 Service Address			
na	0003723822	Level 3 Communications, LLC	Level 3 Communications, LLC	475 Service Address			
na	0015331689	Zayo Enterprise Networks, LLC	Zayo Enterprise Networks, LLC	213 Service Address			

Distinct Speed Tiers Provided

Technology Codes		Allowable	
		Down	Up
10	Asymmetric xDSL	3 to 10	2 to 9
20	Symmetric xDSL	3 to 9	2 to 9
30	Other Copper Wireless	3 to 11	2 to 11
40	Cable Modem-DOCSIS 3.0	3 to 10	2 to 7
41	Cable Modem-Other	3 to 7	2 to 7
50	Optical Carrier/Fiber to End User	3 to 11	2 to 11
60	Satellite	3 to 5	2 to 4
70	Terrestrial Fixed Wireless-Unlicensed	3 to 7	2 to 7
71	Terrestrial Fixed Wireless-Licensed	3 to 7	2 to 7
80	Terrestrial Mobile Wireless	3 to 7	2 to 7
90	Electric Power Lines	3 to 5	2 to 5
0	All Other	3 to 11	2 to 11

Speed Tier Codes	
1	< 200 kps.
2	>200 kps, < 768 kps.
3	> 768 kps, < 1.5 mbps.
4	> 1.5 mbps, < 3 mbps.
5	> 3 mbps, < 6 mbps.
6	> 6 mbps, < 10 mbps.
7	> 10 mbps, < 25 mbps.
8	> 25 mbps, < 50 mbps.
9	> 50 mbps, < 100 mbps.
10	> 100 mbps, < 1 gbps.
11	> 1 gbps.

Maximum Advertised Speed				Typical Speed			
Technology	Download	Upload	Freq.	Technology	Download	Upload	Freq.
10	3	2	327	10	3	2	7317
10	3	3	4845	10	3	3	4411
10	4	2	27495	10	4	2	29536
10	4	3	20553	10	4	3	19650
10	5	2	14280	10	5	2	22961
10	5	3	11047	10	5	3	13264
10	6	2	2654	10	6	2	2575
10	6	3	27435	10	6	3	10026
10	6	4	1181	10	7	3	27268
10	6	5	3	10	7	4	70819
10	6	6	9669	10	8	5	11018
10	7	3	33993	10	8	7	22030
10	7	4	73641	10	9	8	46
10	7	5	272	10	ZZ	ZZ	26888
10	7	7	1835	20	3	3	601
10	8	4	11	20	4	4	13899
10	8	5	11018	20	5	5	1109
10	8	7	22030	20	6	6	55436
10	8	8	293	20	7	7	2224
10	9	7	4303	20	8	8	1799
10	9	8	924	20	ZZ	ZZ	968
20	3	2	215	30	3	3	3
20	3	3	372	30	4	2	37
20	4	4	6768	30	4	4	2653
20	5	3	2	30	5	5	76379
20	5	5	8656	30	6	4	22
20	6	6	53466	30	6	6	36
20	7	7	3831	30	7	5	2
20	8	8	2726	30	7	6	1099
30	3	2	624	30	7	7	451
30	3	3	1137	30	8	8	54
30	4	4	2969	30	ZZ	ZZ	4273

Maximum Advertised Speed					Typical Speed			
Technology	Download	Upload	Freq.		Technology	Download	Upload	Freq.
30	5	4	5		40	ZZ	ZZ	72434
30	5	5	76881		41	5	2	93
30	6	4	37		41	7	2	772
30	6	6	134		41	7	4	266
30	7	6	1121		41	ZZ	ZZ	47098
30	7	7	2020		50	5	2	77
30	8	6	2		50	6	3	4
30	8	8	79		50	7	3	1152
40	10	7	72232		50	7	4	2731
41	3	2	6317		50	7	5	23
41	3	3	10639		50	7	6	49
41	4	2	695		50	7	7	799
41	4	3	4		50	8	7	33
41	4	4	11		50	10	9	25
41	5	2	93		50	10	10	516
41	5	3	5		50	11	11	475
41	5	4	2		50	ZZ	ZZ	80738
41	6	3	739		60	3	2	2
41	6	4	1		60	4	2	1
41	6	5	61		60	ZZ	ZZ	2
41	6	6	1486		70	3	2	2
41	7	2	772		70	3	3	3
41	7	3	22544		70	4	3	3
41	7	4	2050		70	4	4	1
41	7	7	668		70	5	2	3
41	8	8	2344		70	5	3	3
50	3	3	281		70	5	4	1
50	4	4	32186		70	5	5	1
50	5	5	20335		70	6	4	2
50	6	3	4		70	6	5	2
50	6	6	5923		70	6	6	2
50	7	3	1152		70	7	7	2
50	7	4	3554		70	ZZ	ZZ	24
50	7	5	4568		71	3	2	1
50	7	7	2719		71	3	3	4
50	8	7	1152		71	4	2	1
50	8	8	1802		71	5	2	1
50	9	7	1871		71	5	3	2
50	9	8	878		71	6	3	1
50	9	9	6064		71	6	4	1
50	10	7	2407		71	7	7	1
50	10	9	176		71	ZZ	ZZ	8
50	10	10	267		80	3	2	4

Maximum Advertised Speed					Typical Speed			
Technology	Download	Upload	Freq.		Technology	Download	Upload	Freq.
50	11	10	35		80	3	3	1
50	11	11	1248		80	5	3	2
60	4	2	1		80	6	3	1
60	5	3	2		80	6	5	1
60	7	4	1		80	ZZ	ZZ	10
60	7	5	1					
70	3	2	1					
70	3	3	3					
70	4	3	3					
70	4	4	2					
70	5	2	2					
70	5	3	4					
70	5	4	2					
70	5	5	2					
70	6	2	1					
70	6	3	2					
70	6	4	4					
70	6	5	3					
70	6	6	4					
70	7	3	1					
70	7	4	2					
70	7	5	2					
70	7	6	1					
70	7	7	10					
71	3	2	1					
71	3	3	4					
71	4	2	1					
71	5	2	1					
71	5	3	3					
71	5	5	1					
71	6	3	1					
71	6	4	1					
71	6	5	1					
71	6	6	3					
71	7	7	3					
80	3	2	6					
80	4	2	1					
80	4	3	2					
80	5	3	1					
80	5	4	3					
80	6	4	2					
80	7	3	1					
80	7	4	1					
80	7	5	2					