

Colorado Broadband Data & Development Program

October 1, 2014 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 October 1, 2014 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 & 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. The last six cycles, efforts to track down broadband providers has yielded positive results. Numerous broadband Providers have been identified and have participated in our data collection efforts. Between April 2014 and October 2014, 8 new Providers were identified. Currently, 167 Providers have been identified: 6 do not meet broadband requirements, 54 reported 'No Data Change', 54 submitted new data changes or needed corrections, 9 are non-responsive, 3 refuse to participate, and 41 are out of business (37 were reported last cycle, while 1 participating Provider went out of business or merged between the April 1, 2014 Data Delivery and the current data delivery). Efforts to identify all broadband providers in Colorado is ongoing.

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	October 2014
Potential Identified Providers	167
Data Sets Delivered to NTIA	108
Non-Responsive Providers	9
Not a Broadband Provider	6
Will Not Provide Data	3
Out of Business	41

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

Service Provider Updates	October 2014
New in Data Set	8
Updated Data	54
Responded "No Data Change"	54
Data Sets Delivered to NTIA	108

As mentioned in the previous delivery cycles, in February, our team welcomed a new member to assist in the CAI data collection effort by calling facilities for speed tests and collecting broadband information specific to the institution. The CBDDP is very pleased with the progress that has been made in promoting speed tests among reporting CAI's. We have encouraged our providers to reach out to Community Anchor Institutions within their broadband coverage area and we have personally reached out to known CAI's to update provider information and speed tests. We eliminated duplicate CAI records, expired CAI's, and those which could not be located or identified. We were able to add new CAI's for the current delivery cycle. The CBDDP has expanded the number of CAIs submitting speed test information between October 2013 and the current delivery and final delivery. The following table shows the number of community anchor institutions that have been identified in the state:

Community Anchor Institutions	October 2014		
	Identified	Collected	Includes Speed Test
Cat. 1 - School K -12	2192	2192	1006
Cat. 2 - Library	258	258	119
Cat. 3 - Medical/Healthcare	725	725	263
Cat. 4 - Public Safety	1760	1760	601
Cat. 5 - University/College	71	71	20
Cat. 6 - Other Government	626	626	309
Cat. 7 - Other non-Government	90	90	8
TOTALS	5722	5722	2326

The CBDDP chooses to report multiple CAIs at the same address as distinct entities (i.e. 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 October 2014 Data Set

Techniques:

1. Automated Validation
2. Analysis of Change
3. Visual Review
4. Website Validation
5. Feedback Loop
6. CAI Speed Test Analysis
7. Drive Testing Mobile Coverage Areas
8. Mobile Pulse
9. FCC Speed Test Validation
10. Crowd Sourcing

1. Automated Validation

The CBDDP has been developing and improving automated validation scripts since its first data delivery processed in house in April 2011. The CBDDP runs both the script it has developed as well as the script provided by the NTIA on final dataset post processing in every delivery cycle. 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 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

The three major types of data changes between the April 2014 and October 2014 delivery:

- New providers
- Transfer of broadband services between providers
- Receiving new data from existing providers

The coverage in this delivery reflects the increase or decrease in service from these changes. As a result of efforts to decrease the amount of exaggerated coverage, there has been a decrease in the amount of coverage for some types of features. The following table shows the percentage change in the number of features from April 2014 to October 2014:

	Census Blocks		Road Segments		Wireless Service		Middle Mile		Address Pts	
	Number of Providers	% Number of Features Changed	Number of Providers	% Number of Features Changed	Number of Providers	% Number of Features Changed	Number of Providers	% Number of Features Changed	Number of Providers	% Number of Features Changed
New Providers	3	100%	1	100%	7	100%	4	100%	0	0%
Received new data	23	-4%	19	-56%	27	-2%	32	-26%	3	-5%
Re-processed existing data	0	0%	0	0%	2	-20%	2	0%	0	0%
No Changes	29	0%	27	0%	33	0%	35	0%	2	0%

3. Visual Review

The CBDDP routinely reviews the coverage areas of new service providers and those with updates or changes to coverage in preparation for each delivery. After the April 2013 data delivery, in an effort to prevent wireless providers from exaggerated coverage, all wireless tower locations provided in the April coverage were inspected using aerial imagery in order to identify existing towers on the surface. Where towers could not be identified, the CBDDP contacted the provider to verify the accuracy of tower location information. We also verified tower points falling atop other surface features, for instance, water silos, grain elevators, dwelling structures, or tall buildings. Additionally, tower specification information was requested from all wireless providers, if information was currently unknown. Numerous wireless providers submit PDF's of polygon coverage or claimed coverage extended uniformly a certain radius from tower. In order to prevent further exaggeration of wireless coverage, beam radius, azimuth, tower height, and frequency were requested for each tower to be used in a wireless coverage model. A more accurate coverage model was created for all the providers in compliance with our requests.

4. Website Validation

After the April 2013 data delivery our team also extended validation efforts to provider website analysis. For all providers having a website where address information could be input to determine available speeds, OIT entered a random sample of addresses and compared the available service speeds according to the web site to the speeds submitted by the provider. The following providers were evaluated: Comcast, CenturyTel, Megapath Corporation, Strasburg Telephone Company, and Time Warner Cable. The address dataset used in analysis consisted of 30 addresses with a rural and urban mix (20/10), per provider, per county. Counties evaluated

include Adams, Boulder, Broomfield, Clear Creek, Denver, El Paso, Elbert, Gunnison, Jefferson, Kit Carson, Larimer, Logan, Ouray, Teller, and Weld County. The CBDDP discussed with providers inconsistencies between information reported on their web sites and coverage submitted for the data delivery.

5. Feedback Loop

As a routine part of our processing 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 the results to providers for verification of speed accuracy within the provider coverage area.

6. CAI Speed Test Analysis

Community Anchor Institutions are a critical component to identifying broadband coverage accurately. Furthermore, these establishments, and their respective communities benefit greatly from efficient broadband service. The CBDDP acquired CAI data in two ways. The primary method involved using CAI data created by Critigen in 2009, under contract with OIT. CBDDP staff subsequently worked with local governments and acquired data from them in the form of point layers and address lists. Additionally, the CBDDP has developed a web application which allows local members to input new CAI points as well as edit the accuracy of current points. This tool can be located at -

<http://maps.co.gov/CommunityAnchors/Account/LogOn?ReturnUrl=%2fCommunityAnchors>. We expect the use of this application to increase as we train more personnel on it.

Spatial accuracy is a principal goal in regard to CAIs and the CBDDP has spent considerable time editing and improving locations of CAIs. Staff checked existing CAI features for spatial accuracy using several resources including Google Earth, and maps, aerial photography from the National Agricultural Imagery Program, and internet research. Along with rectifying spatial, staff also verifies and corrects attribute data (e.g. address) if necessary. Examples of discrepancies include incorrect addresses, missing attributes, and CAI locations which are not longer operational. As of the present delivery, all CAI locations have been spatially verified. This process will continue moving forward; the dataset will be consistently edited and modified to reflect Community Anchor Institutions accurately.

In addition to ensuring spatial accuracy and identifying the providers and speed of broadband service to CAIs, it is important to identify if CAIs are receiving the broadband speeds as advertised, or if their actual service is slower. OIT has been conducting active telephone outreach efforts to contact individual CAIs and identify characteristics regarding their broadband service, specifically, technology of transmission, and name of provider, and to confirm their address, and collect their actual service speed through an OIT speed test. Staff created predefined scripts in order to help maintain structure and professionalism when contacting CAI locations. Presently, 30 percent of CAIs have been contacted and have provided broadband data. Thus the sample of CAIs with complete broadband attribution has increased significantly since the previous delivery. Due to the broadband limitations present in rural communities, we have targeted a significant portion of our speed test collection efforts at counties with predominantly rural areas. We will continue to update and improve the accuracy and completeness of this data set.

As with other speed tests collected from the general public, several issues exist when comparing CAI speed test data to service provider advertized maximum speeds. Not all speed tests efforts offer provider

information. Therefore, 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, unless the provider is specified. Additionally, even if a speed test result is tied to specific provider, it is not always clear which speed package the CAI chose to subscribe to. Consequently, some bias remains when attempting to compare maximum speeds to observed speeds.

Transmission technology must also be carefully considered for CAIs. Specifically, transmission technology 50, representing optical fiber transmission may be mistakenly attributed to several CAIs. In comparing these locations to census and road features with optical fiber coverage, CBDDP staff found that the majority of these locations are positioned in extremely close proximity to census blocks and roads which do feature fiber coverage. Consequently, we chose to retain the transmission code for these CAIs. There is the possibility that many of these locations no longer fall within the TT50 coverage due to spatial editing, which resulted in their being moved to the opposite side of a census block boundary line. However, many of these locations are present in metropolitan areas such as Denver and Colorado Springs, which have notable optical fiber networks.

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	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	
School K - 12	4	17	37	46	92	98	293	93	100	113	81	34	5	7	1	0	0	1021
Library	0	0	1	4	14	12	21	21	22	19	7	5	2	1	0	0	0	129
Healthcare	0	2	11	9	15	29	41	55	35	44	48	20	5	3	0	0	0	317
Public Safety	0	2	14	19	33	80	123	132	108	76	29	26	12	4	2	0	0	660
University, college	0	0	0	1	1	1	0	5	2	5	3	4	2	1	0	0	0	25
Other Government	0	2	7	8	15	41	62	56	75	42	26	26	6	1	0	0	0	367
Other Non-Government	0	0	0	0	1	0	0	2	0	2	0	1	1	1	0	0	0	8
Totals	4	23	70	87	171	261	540	364	342	301	194	116	33	18	3	0	0	2527
Totals	1862									301	364							

<i>CAI Speed Test Compared to Minimum Download Speed by Census Block</i>																	
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	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	0	0	3	7	10	30	42	87	105	167	161	254	114	23	16	2	1	1022
Library	0	0	0	1	1	2	5	24	12	14	26	9	12	14	4	1	0	125
Healthcare	0	0	1	0	4	17	19	25	31	33	57	52	28	25	4	3	0	299
Public Safety	0	0	0	2	15	27	55	64	101	93	94	101	55	37	26	2	0	672
University, college	0	0	0	0	1	0	0	0	1	2	2	1	3	3	5	4	0	22
Other Government	0	1	1	0	6	15	34	31	72	41	41	61	34	17	7	3	0	364
Other Non-Government	0	0	0	0	0	0	0	1	1	0	2	2	1	1	0	0	0	8
Totals	0	1	5	10	37	91	155	232	323	350	383	480	247	120	62	15	1	2512
Totals	854									350	1308							

7. Drive Testing Mobile Coverage Areas

The CBDDP tested the mobile wireless coverage areas reported by mobile service providers. The CBDDP completed drive testing for over 5,000 miles of roads three years 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.

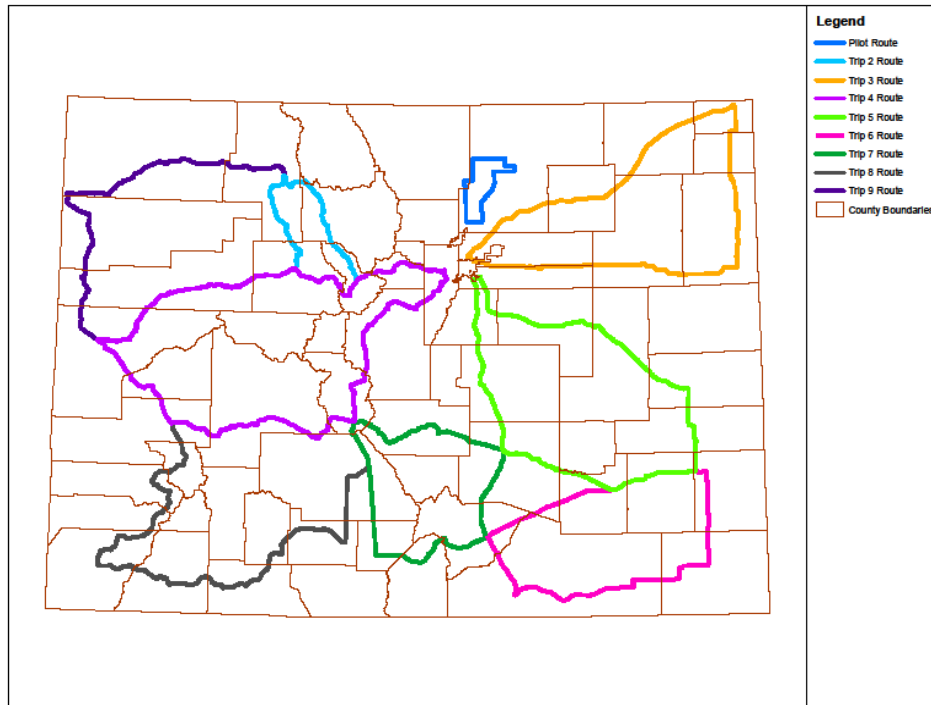


Figure 1: The following graphic is a general depiction of the routes used for the drive testing.

The following table presents the results of these drive tests when compared to maximum advertised download speed submitted to the broadband coverage model from each provider. 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>	< -5	-4	-3	-2	-1	0	1	2	3	
	598	440	239	101	16	2	0	0	0	1396
Totals	1394					2	0			
ATT										
	Tiers Slower					Same Tier	Tiers Faster			Total
<i>Number of Speed Tiers Slower or Faster</i>	< -5	-4	-3	-2	-1	0	1	2	3	
	175	77	78	96	10	1	0	0	0	437
Totals	436					1	0			

MOBILE WIRELESS COVERAGE TESTING										
Sprint										
	Tiers Slower					Same Tier	Tiers Faster			Total
Number of Speed Tiers Slower or Faster	< -5	-4	-3	-2	-1	0	1	2	3	
	226	206	66	4	5	0	0	0	0	507
Totals	507					0	0			
Verizon										
	Tiers Slower					Same Tier	Tiers Faster			Total
Number of Speed Tiers Slower or Faster	< -5 Kbps	-4	-3	-2	-1	0	1	2	3	
	197	157	95	1	1	1	0	0	0	452
Totals	451					1	0			

9. Mobile Pulse

The CBDDP collected speed test data from a private vendor of a mobile speed testing service, Mobile Pulse. The 3rd party vendor collects speed tests from an application and device installed on personal or government agency vehicles. The speed tests submitted by Mobile Pulse significantly increased the mobile data set currently used for validation. Due to the continuous enhancement of technology, acquiring current speed test data is essential to demonstrate accurate validation of provider coverage. The Mobile Pulse dataset was used to validate the following providers: AT&T, Sprint, T-Mobile, and Verizon.

MOBILE PULSE WIRELESS COVERAGE TESTING										
ATT										
	Tiers Slower					Same Tier	Tiers Faster			Total Tests
<i>Number of Speed Tiers Slower or Faster</i>	< -5	-4	-3	-2	-1	0	1	2	3	
	19085	11316	10734	3410	906	133	0	0	0	45584
<i>Totals</i>	45451					133	0			
Sprint										
	Tiers Slower					Same Tier	Tiers Faster			Total
<i>Number of Speed Tiers Slower or Faster</i>	< -5	-4	-3	-2	-1	0	1	2	3	
	19899	3703	801	225	306	73	0	0	0	25007
<i>Totals</i>	24934					73	0			
T-Mobile										
	Tiers Slower					Same Tier	Tiers Faster			Total
<i>Number of Speed Tiers Slower or Faster</i>	< -5	-4	-3	-2	-1	0	1	2	3	
	1791	125	341	670	524	171	2	0	0	3624
<i>Totals</i>	3451					171	2			

MOBILE PULSE WIRELESS COVERAGE TESTING									
Verizon									
	Tiers Slower					Same Tier	Tiers Faster		
Number of Speed Tiers Slower or Faster	< -5	-4	-3	-2	-1	0	1	2	3
	51392	21555	8114	3967	3756	436	1	0	0
Totals	88784					436	1		

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 app on a mobile device (i.e. iPhone or Android).

To validate the broadband service data using the FCC CBT speed tests, the CBDDP generalized the final broadband data set into two layers, one representing maximum available download speed among all providers and one showing the overall minimum available download speed. The census blocks were merged with overlapping buffered roads with same speed tier in order to include coverage in rural areas in these layers. We then buffered FCC CBT speed test points using a 150 foot buffer and compared these buffers 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 2013 data submission because we used test points from a wider date range was used for the current delivery, than in the previous delivery.

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															
	<-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6 +	
Maximum	305	197	409	459	874	454	117	81	43	8	1	0	0	0	
Totals	2815							81	52						

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															
	<-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6 +	
Minimum	5	6	22	59	152	235	262	410	419	758	478	141	17	2	
Totals	741							410	1815						

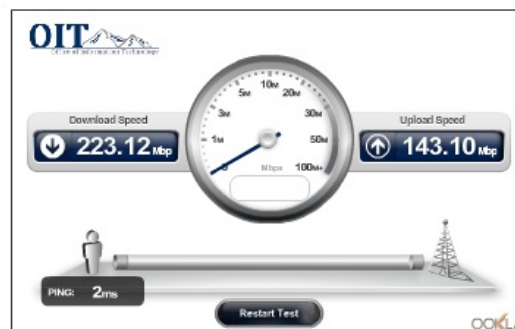
The FCC Mobile Data includes speed tests collected using the app on a mobile device (i.e. iPhone or Android). To validate mobile speed data, CBDDP staff compared the mobile service providers maximum available download speed with the FCC speed tests from mobile providers. As with the drive test data described above and the Mobile Pulse data, we compared the tests to our data for each specific provider. Again, we buffered the speed test points by 150 feet and joined spatially compared to the buffers to mobile 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, Commnet, 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 Tiers Slower or Faster	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7+	
Composite															
	1393	2186	1974	2436	2941	1945	3887	102	5	2	1	0	0	0	16872
Totals	12875						3887	110							
AT&T															
	1341	2070	1884	2452	2978	1989	3939	122	22	3	1	0	0	0	16801
Totals	12714						3939	148							
Commnet															
	41	100	91	102	82	46	45	0	0	0	0	0	0	0	507
Totals	462						45	0							
Leap															
	0	0	0	0	1099	1743	1543	2001	2548	1734	3614	97	0	1	14380
Totals	2842						1543	9995							
Nucla															
	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2
Totals	2						0	0							
Sprint															
	0	174	931	1327	1669	2242	2485	2300	3029	664	1381	18	1	0	16221
Totals	6343						2485	7393							

T-Mobile															
	1286	1954	1711	2259	2834	1990	3841	142	17	29	1	0	0	0	16064
Totals	12034						3841	189							
Verizon															
	1383	2169	1958	2398	2920	1945	3886	106	5	0	5	0	0	0	16775
Totals	12773						3886	116							
Viaero															
	32	70	55	61	82	38	28	6	0	0	0	0	0	0	372
Totals	338						28	6							

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.



Please Enter Your Test Information Below: 

Street:

City:

State: Zip:

Provider:

Technology:

Monthly Cost:

Speed:

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.

In summary, provider validation efforts continue to improve. For the October 2014 data delivery, the CBDDP used speed tests from the FCC, CAI's, drive tests, Mobile Pulse, public speed test application, and the provider speed test application. Validation against mobile provider coverage uses drive tests, Mobile Pulse, 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_2014_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, 2011 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 January 15, 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.

Colorado

Data Summary

File Summary

File Type		Number of Records
Total Records in all Files		579857
Census Block < 2 sq. miles		410199
Street Segments		88983
Wireless Shape File		114
Service Address		3357
BB Service Overview		0
Community Anchor Institutions		5722
Middle Mile		1848
Metadata Provided for Geospatial Data		Yes

Provider Information

File Type		Number of Records
Number of ISPs Provided		108

Colorado

Census Blocks < 2 sq. miles

Data Type	Code	Data Element	Count	%	Data Type	Code	Data Element	Count	%
Records Details		Total Records	410199		Typical Download Speed	3	>= 768 kbps. < 1.5 mbps.	8942	2.2%
		Census Blocks < 2 sq. miles with Broadband	137675			4	>= 1.5 mbps. < 3 mbps.	32063	7.8%
		Census Blocks < 2 sq. miles in State (with & without broadband)	192101			5	>= 3 mbps. < 6 mbps.	99768	24.3%
		Census Blocks > 2 sq. miles in the State (with & without broadband)	8961			6	>= 6 mbps. < 10 mbps.	65169	15.9%
		Total Census Blocks in the State (with & without broadband)	201062			7	>= 10 mbps. < 25 mbps.	79406	19.4%
Services Provider Details		Number of Distinct Providers	55			8	>= 25 mbps. < 50 mbps.	37373	9.1%
		Number of Distinct "Doing Business As"	52			9	> 50 mbps, < 100 mbps.	344	0.1%
		Number of Distinct FRN	55			10	> 100 mbps, < 1 gbps.	114	0.0%
Technology	10	Asymmetric xDSL	176731	43.1%		11	> 1 gbps.	80	0.0%
	20	Symmetric xDSL	61576	15.0%	ZZ "null"				
	30	Other Copper Wireless	78107	19.0%	Max. Advertised Upload Speed	2	>200 kbps, < 768 kbps.	18095	4.4%
	40	Cable Modem-DOCSIS 3.0	61944	15.1%		3	>= 768 kbps. < 1.5 mbps.	81202	19.8%
	41	Cable Modem-Other	19558	4.8%		4	> 1.5 mbps, < 3 mbps.	55760	13.6%
	50	Optical Carrier/Fiber	12283	3.0%		5	> 3 mbps, < 6 mbps.	107993	26.3%
	60	Satellite	0	0.0%		6	> 6 mbps, < 10 mbps.	38490	9.4%
	70	Terrestrial Fixed Wireless-Unlicensed	0	0.0%		7	> 10 mbps, < 25 mbps.	96333	23.5%
	71	Terrestrial Fixed Wireless-Licensed	0	0.0%		8	> 25 mbps, < 50 mbps.	4392	1.1%
	80	Terrestrial Mobile Wireless	0	0.0%		9	> 50 mbps, < 100 mbps.	1366	0.3%
	90	Electrical Power Line	0	0.0%		10	> 100 mbps, < 1 gbps.	240	0.1%
	0	Other	0	0.0%		11	> 1 gbps.	6328	1.5%
Max. Advertised Download Speed	3	> 768 kbps, < 1.5 mbps.	2586	0.6%	Typical Upload Speed	2	>200 kbps, < 768 kbps.	34913	8.5%
	4	> 1.5 mbps, < 3 mbps.	27536	6.7%		3	> 768 kbps, < 1.5 mbps.	61572	15.0%
	5	> 3 mbps, < 6 mbps.	96400	23.5%		4	> 1.5 mbps, < 3 mbps.	56237	13.7%
	6	> 6 mbps, < 10 mbps.	81402	19.8%		5	> 3 mbps, < 6 mbps.	99023	24.1%
	7	> 10 mbps, < 25 mbps.	90806	22.1%		6	> 6 mbps, < 10 mbps.	40266	9.8%
	8	> 25 mbps, < 50 mbps.	39144	9.5%		7	> 10 mbps, < 25 mbps.	28086	6.8%
	9	> 50 mbps, < 100 mbps.	6523	1.6%		8	> 25 mbps, < 50 mbps.	2957	0.7%
	10	> 100 mbps, < 1 gbps.	59474	14.5%		9	> 50 mbps, < 100 mbps.	125	0.0%
	11	> 1 gbps.	6523	1.6%		10	> 100 mbps, < 1 gbps.	0	0.0%
						11	> 1 gbps.	11	0.0%
					ZZ "null"				
Provider Type	1	Provider	410199	100.0%					
	2	Reseller	0	0.0%					
End User Name	1	Residential	282790	68.9%					
	2	Governmental	126474	30.8%					
	3	Small Business	111	0.0%					
	4	Med or Lrg Enterprise	824	0.2%					

Colorado

Street Segment

Data Type	Code	Data Element	Count	%	Data Type	Code	Data Element	Count	%
Record Details		Total Records	88983		Typical Download Speed	3	> 768 kbps, < 1.5 mbps.	3258	3.7%
Services Provider Details		Number of Distinct Providers	47			4	> 1.5 mbps, < 3 mbps.	3446	3.9%
		Number of Distinct "Doing Business As"	44			5	> 3 mbps, < 6 mbps.	10438	11.7%
		Number of Distinct FRN	47			6	> 6 mbps, < 10 mbps.	22596	25.4%
						7	> 10 mbps, < 25 mbps.	13368	15.0%
Technology	10	Asymmetric xDSL	38207	42.9%		8	> 25 mbps, < 50 mbps.	4476	5.0%
	20	Symmetric xDSL	15872	17.8%		9	> 50 mbps, < 100 mbps.	2	0.0%
	30	Other Copper Wireless	7042	7.9%		10	> 100 mbps, < 1 gbps.	0	0.0%
	40	Cable Modem-DOCSIS 3.0	9430	10.6%		11	> 1 gbps.	0	0.0%
	41	Cable Modem-Other	6446	7.2%		ZZ "null"		31099	34.9%
	50	Optical Carrier/Fiber	11986	13.5%	Max. Advertised Upload Speed	2	>200 kbps, < 768 kbps.	2152	2.4%
	60	Satellite	0	0.0%		3	> 768 kbps, < 1.5 mbps.	19596	22.0%
	70	Terrestrial Fixed Wireless-Unlicensed	0	0.0%		4	> 1.5 mbps, < 3 mbps.	11542	13.0%
	71	Terrestrial Fixed Wireless-Licensed	0	0.0%		5	> 3 mbps, < 6 mbps.	18378	20.7%
	80	Terrestrial Mobile Wireless	0	0.0%		6	> 6 mbps, < 10 mbps.	15196	17.1%
	90	Electrical Power Line	0	0.0%		7	> 10 mbps, < 25 mbps.	13563	15.2%
	0	Other	0	0.0%		8	> 25 mbps, < 50 mbps.	4184	4.7%
Max. Advertised Download Speed	3	> 768 kbps, < 1.5 mbps.	2888	3.2%		9	> 50 mbps, < 100 mbps.	4029	4.5%
	4	> 1.5 mbps, < 3 mbps.	3986	4.5%		10	> 100 mbps, < 1 gbps.	0	0.0%
	5	> 3 mbps, < 6 mbps.	9835	11.1%		11	> 1 gbps.	343	0.4%
	6	> 6 mbps, < 10 mbps.	24248	27.3%	Typical Upload Speed	2	>200 kbps, < 768 kbps.	1922	2.2%
	7	> 10 mbps, < 25 mbps.	25515	28.7%		3	> 768 kbps, < 1.5 mbps.	17380	19.5%
	8	> 25 mbps, < 50 mbps.	5623	6.3%		4	> 1.5 mbps, < 3 mbps.	7878	8.9%
	9	> 50 mbps, < 100 mbps.	3439	3.9%		5	> 3 mbps, < 6 mbps.	11189	12.6%
	10	> 100 mbps, < 1 gbps.	0	0.0%		6	> 6 mbps, < 10 mbps.	15195	17.1%
	11	> 1 gbps.	0	0.0%		7	> 10 mbps, < 25 mbps.	944	1.1%
Provider Type	1	Provider	88983	100.0%		8	> 25 mbps, < 50 mbps.	3374	3.8%
	2	Reseller	0	0.0%		9	> 50 mbps, < 100 mbps.	2	0.0%
End User Name	1	Residential	83474	93.8%		10	> 100 mbps, < 1 gbps.	0	0.0%
	2	Governmental	5469	6.1%		11	> 1 gbps.	0	0.0%
	4	Med or Lrg Enterprise	40	0.0%		ZZ "null"		31099	34.9%

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Service Addresses

Data Type	Code	Data Element	Count	%	Data Type	Code	Data Element	Count	%
Record Details		Total Records	3710		Typical Download Speed	3	> 768 kbps, < 1.5 mbps.	0	0.0%
Services Provider Details		Number of Distinct Providers	5			4	> 1.5 mbps, < 3 mbps.	0	0.0%
		Number of Distinct "Doing Business As"	5			5	> 3 mbps, < 6 mbps.	0	0.0%
		Number of Distinct FRN	5			6	> 6 mbps, < 10 mbps.	0	0.0%
						7	> 10 mbps, < 25 mbps.	0	0.0%
Technology	10	Asymmetric xDSL	0	0.0%		8	> 25 mbps, < 50 mbps.	0	0.0%
	20	Symmetric xDSL	0	0.0%		9	> 50 mbps, < 100 mbps.	0	0.0%
	30	Other Copper Wireless	0	0.0%		10	> 100 mbps, < 1 gbps.	516	13.9%
	40	Cable Modem-DOCSIS 3.0	0	0.0%		11	> 1 gbps.	2261	60.9%
	41	Cable Modem-Other	0	0.0%		ZZ "null"		933	25.1%
	50	Optical Carrier/Fiber	3710	100.0%	Max. Advertised Upload Speed	2	>200 kbps, < 768 kbps.	0	0.0%
	60	Satellite	0	0.0%		3	> 768 kbps, < 1.5 mbps.	0	0.0%
	70	Terrestrial Fixed Wireless-Unlicensed	0	0.0%		4	> 1.5 mbps, < 3 mbps.	0	0.0%
	71	Terrestrial Fixed Wireless-Licensed	0	0.0%		5	> 3 mbps, < 6 mbps.	0	0.0%
	80	Terrestrial Mobile Wireless	0	0.0%		6	> 6 mbps, < 10 mbps.	0	0.0%
	90	Electrical Power Line	0	0.0%		7	> 10 mbps, < 25 mbps.	0	0.0%
	0	Other	0	0.0%		8	> 25 mbps, < 50 mbps.	0	0.0%
Max. Advertised Download Speed	3	> 768 kbps, < 1.5 mbps.	0	0.0%		9	> 50 mbps, < 100 mbps.	0	0.0%
	4	> 1.5 mbps, < 3 mbps.	0	0.0%		10	> 100 mbps, < 1 gbps.	531	14.3%
	5	> 3 mbps, < 6 mbps.	0	0.0%		11	> 1 gbps.	3179	85.7%
	6	> 6 mbps, < 10 mbps.	0	0.0%	Typical Upload Speed	2	>200 kbps, < 768 kbps.	0	0.0%
	7	> 10 mbps, < 25 mbps.	0	0.0%		3	> 768 kbps, < 1.5 mbps.	0	0.0%
	8	> 25 mbps, < 50 mbps.	0	0.0%		4	> 1.5 mbps, < 3 mbps.	0	0.0%
	9	> 50 mbps, < 100 mbps.	0	0.0%		5	> 3 mbps, < 6 mbps.	0	0.0%
	10	> 100 mbps, < 1 gbps.	480	12.9%		6	> 6 mbps, < 10 mbps.	0	0.0%
	11	> 1 gbps.	3230	87.1%		7	> 10 mbps, < 25 mbps.	0	0.0%
Provider Type	1	Provider	2741	73.9%		8	> 25 mbps, < 50 mbps.	0	0.0%
	2	Reseller	969	26.1%		9	> 50 mbps, < 100 mbps.	0	0.0%
End User Name	1	Residential	0	0.0%		10	> 100 mbps, < 1 gbps.	516	13.9%
	2	Governmental	3710	100.0%		11	> 1 gbps.	2261	60.9%
					ZZ "null"				

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Community Anchor Institution

Data Type	Code	Data Element	Count	%
Record Details		Total Records	5722	
Anchor Category	1	School-K through 12	2192	38.3%
	2	Library	258	4.5%
	3	Medical/healthcare	725	12.7%
	4	Public safety	1760	30.8%
	5	University, college, other post-secondary	71	1.2%
	6	Other community support-/gov't	626	10.9%
	7	Other community support-non-/gov't	90	1.6%
Technology	10	Asymmetric xDSL	998	17.4%
	20	Symmetric xDSL	48	0.8%
	30	Other Copper Wireless	1730	30.2%
	40	Cable Modem-DOCSIS 3.0	39	0.7%
	41	Cable Modem-Other	166	2.9%
	50	Optical Carrier/Fiber	1986	34.7%
	60	Satellite	33	0.6%
	70	Terrestrial Fixed Wireless-Unlicensed	36	0.6%
	71	Terrestrial Fixed Wireless-Licensed	106	1.9%
	80	Terrestrial Mobile Wireless	1	0.0%
	90	Electrical Power Line	0	0.0%
	0	Other	0	0.0%
		-9999 "null"	579	10.1%
Max. Advertised Download Speed	1	< 200 kbps.		0.0%
	2	>200 kbps, < 768 kbps.	35	0.6%
	3	> 768 kbps, < 1.5 mbps.	118	2.1%
	4	> 1.5 mbps, < 3 mbps.	243	4.2%
	5	> 3 mbps, < 6 mbps.	302	5.3%
	6	> 6 mbps, < 10 mbps.	216	3.8%
	7	> 10 mbps, < 25 mbps.	516	9.0%
	8	> 25 mbps, < 50 mbps.	188	3.3%
	9	> 50 mbps, < 100 mbps.	103	1.8%
	10	> 100 mbps, < 1 gbps.	131	2.3%
	11	> 1 gbps.	10	0.2%
		ZZ "null"	3860	67.5%
Max. Advertised Upload Speed	1	< 200 kbps.	1	0.0%
	2	>200 kbps, < 768 kbps.	100	1.7%
	3	> 768 kbps, < 1.5 mbps.	218	3.8%
	4	> 1.5 mbps, < 3 mbps.	255	4.5%
	5	> 3 mbps, < 6 mbps.	384	6.7%
	6	> 6 mbps, < 10 mbps.	344	6.0%
	7	> 10 mbps, < 25 mbps.	319	5.6%
	8	> 25 mbps, < 50 mbps.	91	1.6%
	9	> 50 mbps, < 100 mbps.	55	1.0%
	10	> 100 mbps, < 1 gbps.	77	1.3%
	11	> 1 gbps.	5	0.1%
		ZZ "null"	3873	67.7%
Y/N Broadband Service	Y	Yes-Subscribers to Service	5327	93.1%
	N	No-Does Not Subscribers to Service	395	6.9%
	U	Unknown	0	0.0%
Lat/Long Accuracy	1	Lat/Long falls within the State	5722	
	2	Total Lat/Long	5722	100%
Anchor Names	Total Count Anchors Names		5722	
	Distinct Count of Anchor Names		5580	
Community Anchor Institution Category Count with Broadband Information	1	School-K through 12	2192	2159
	2	Library	258	252
	3	Medical/healthcare	725	695
	4	Public safety	1760	1522
	5	University, college, other post-secondary	71	70
	6	Other community support-/gov't	626	557
	7	Other community support-non-/gov't	90	72
		Totals	5722	5327
Public WIFI	Y	Yes	442	
	N	No	5216	
	U	Unknown	64	

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Middle Mile

Data Type	Code	Data Element	Count	%	Data Type	Code	Data Element	Count	%
Record Details		Total Records	1848		Facility Type	1	Fiber	645	34.9%
						2	Copper	5	0.3%
Services Provider Details		Number of Distinct Providers	72			3	Hybrid Fiber Coax (HFC)	1	0.1%
		Number of Distinct "Doing Business As"	68			4	Wireless	1197	64.8%
		Number of Distinct FRN	71				N/A "null"	0	0.0%
Ownership	0	Owned	1093	59.1%	Lat / Long		# of Lat/Long in State	1848	100%
	1	Leased	775	41.9%			Total Lat/Long	1848	
Facility Capacity	1	Multiple T1's and less than 40 mbps.	859	46.5%	Elevation		Number of Data Points	1848	
	2	Greater than 40 mbps. and less than 150 mbps.	263	14.2%			Lowest Elevation	0	
	3	Greater than 150 mbps. and less than 600 mbps.	187	10.1%			Highest Elevation	350	
	4	Greater than 600 mbps. and less than 2.4 gbps.	81	4.4%					
	5	Greater than 2.4 gbps. and less than 10 gbps.	1	0.1%					
	6	Greater than 10 gbps	457	24.7%					

Colorado

Services Providers

#	Broadband Services Providers Submitted			Census	Roads	Wireless	Mid Mile
	FRN	Company Name	Doing Business As				
1	0022810253	Aerux Broadband	Aerux Broadband			1	15
2	0004311627	Agate Mutual Telephone Cooperative Association	Prairie Networks, LLC	28	214		10
3	0019535699	Airbits, LLC	Airbits, LLC			1	25
4	0021772892	Ark Valley Internet	Ark Valley Internet			1	26
5	0004496774	AT&T Inc.	AT&T Corp, Inc.			9	1
6	0014860522	Baja Broadband Holding Company	TDS Telecom	3551	349		4
7	0003728292	Beulahland Communications, Inc.,	Beulahland Communications, Inc.,			1	1
8	0010612067	Big Sandy Telecom, Inc.	Big Sandy Telecom, Inc.	189	506		18
9	0003754652	Bijou Telephone Co-op Association, Inc.	Bijou Telephone Co-op Association, Inc.	1005	1082	2	4
10	0003766201	Blanca Telephone Company	Blanca Telephone Company	2205	2409		
11	0017108747	Brainstorm Internet	Forethought	562	54	3	45
12	0014778781	BySky, Inc.	BySky, Inc.			1	
13	0019746445	CAP Cable	USA Communications	912	5	1	
14	0018589259	Cardinal Broadband, LLC	Cardinal Broadband, LLC	33			
15	0018626853	CenturyTel, Inc.	CenturyLink	93851	16101		
16	0007001977	Charter Communications, Inc.	Bresnan Communications	15719	5484		
17	0006980866	Chase 3000, Inc.	Chase 3000, Inc.			1	2
18	0001621127	City of Glenwood Springs	City of Glenwood Springs, Community Broadband Network	110		1	4
19	0023449127	Cityless Internet Services, LLC	City Less Internet Services, LLC				
20	9999	Colorado Wireless Exchange Cooperative	Colorado Wireless Exchange Cooperative			1	3
21	0002147098	Columbine Telecom Company	FairPoint Communications	333	326	1	20
22	0004441663	Comcast Cable Communications, LLC	Comcast	58014	9079		
23	0018122879	Commnet Wireless	Commnet Wireless			4	51
24	0001617281	Delta County Tele-comm, Inc.	TDS Telecom	902	1062		1
25	0020233508	DirectLink, LLC	DirectLink, LLC			1	77
26	0017195017	Diverse Datum, Inc.	Diverse Datum, Inc.			1	33
27	0001629781	Dubois Telephone Exchange, Inc.,	DTE	55	113	1	4
28	0013339973	Eagle Communications, Inc.	Eagle Cable TV And Internet	237	29	2	1
29	0004317731	Eastern Slope Rural Telephone Association, Inc.	Eastern Slope Rural Telephone Association, Inc.	1930	6059		12
30	0461178919	Elite Broadband	Elite Broadband			1	1
31	0003767852	Eschelon Telecom of Colorado, Inc.	Integra Telecom	81749	20731		
32	0017509779	Estes Valley Networks, Inc.	Estes Valley Networks, Inc.			1	3
33	0019436757	Falcon Broadband, Inc.	Falcon Broadband, Inc.	276	12		
34	0005059092	Farmers Telephone Company	Farmers Telecommunications	72		1	1
35	0004338489	Farmers Telephone Company	Farmers Telephone Company	180	921		12
36	0007719719	FastTrack Communications, Inc.	FastTrack Communications, Inc.	420	738		
37	0015575285	Front Range Internet, Inc.	Front Range Internet, Inc.	5794	97		1

Colorado

Services Providers							
#	Broadband Services Providers Submitted			Census	Roads	Wireless	Mid Mile
	FRN	Company Name	Doing Business As				
38	0014830616	GoGo Inc	GoGo Air				8
39	0016084683	Grand County Internet Services, Inc.	Grand County Internet Services, Inc.			1	40
40	0000824224	Grand Valley Telecommunications, Inc.	Grand Valley Telecommunications, Inc.	1171	10	1	7
41	0004381380	Great Plains Communications, Inc.	Great Plains Communications, Inc.	5	2		
42	0001616200	Haxtun Telephone	Haxtun	1023	1327		
43	0022904270	Hilltop Broadband	Windspeed Networks, LLC			1	25
44	0019794643	HiSpeed 4 U, Inc	HiSpeed 4 U, Inc			1	26
45	0018483073	Hughes Network Systems, LLC	HughesNet			2	
46	0007651219	iLOKA Inc	Microtech-tel	1550	26		
47	0015866460	Internet Colorado	Internet Colorado	364	54	1	17
48	0018706002	Inventive Wireless of Nebraska, LLC	Vistabeam			1	
49	0014175673	JAB Broadband	Skybeam, Inc.			1	399
50	0003766623	Jade Communications, LLC	Jade Communications, LLC			1	7
51	0003728284	J.e.d. Enterprises, Inc.	Pine Drive Telephone Company	203	1355		16
52	0008063521	K2 Communications	K2 Communications, LLC	344		1	1
53	0001611334	KenTec Communications	KenTec Communications	746	1791	1	35
54	9999	Kremmling Technology Services	Kremmling Technology Services, LLC			1	3
55	0002963528	Leap Wireless International, Inc.	Cricket Communications, Inc.,			2	
56	0003723822	Level 3 Communications, LLC	Level 3 Communications, LLC				93
57	0005030200	Live Wire Networks, Inc.	Live Wire Networks, Inc.	293		3	12
58	0023744329	Lyons Communications, LLC	Lyons Communications, LLC	77	8		
59	0018769547	Magnolia Road Internet Coop	MRIC			2	20
60	0003753787	MegaPath Corporation	MegaPath Corporation	125054	4724		3
61	0017223108	MHO Networks	MHO Networks			1	
62	0021388996	Mountain Broadband, LLC	Mountain Broadband			4	51
63	0023464621	Mountain Broadband Network and Communications	Mountain Broadband Network and Communications			2	25
64	0016631087	Mountain Computer Wizards	Mountain Computer Wizards			1	5
65	0001610815	Mountain Village Cable TV	Mountain Village Cable TV	61			
66	9999	Nedernet, Inc.	Nedernet, Inc.			1	15
67	0004312187	Nucla-Naturita Telephone Company	Nucla-Naturita Telephone Company	297	332	2	
68	0004311809	Nunn Telephone Company	Nunn Communication, LLC	199	679		1
69	0022042568	OurayNet	OurayNet			1	13
70	0016286825	PCI Broadband	PCI Broadband			1	7
71	0013648241	Peak Internet	Fundamental Holdings, Corp	260		1	
72	0014699953	Peetz Communications, LLC	Peetz Cooperative Telephone Company	94	179	1	2
73	0004314316	Phillips County Telephone Company	PCTelecom	1117	1031	2	3
74	0001615889	Plains Cooperative Telephone Association, Inc.,	Plains Cooperative Telephone Association, Inc.,	1113	3374	1	52
75	0011953643	Premier Systems Unlimited Inc.	Plains.Net			1	31
76	0016084675	Rebeltec Communications, LLC	Rebeltec	297		1	44
77	0005059092	Rico Telephone Company	Rico Telephone Company	78	93		3
78	0014705602	Roggen Telephone Cooperative Company	Roggen Telephone Enterprises, Inc.			1	7

Colorado

Services Providers

#	Broadband Services Providers Submitted			Census	Roads	Wireless	Mid Mile
	FRN	Company Name	Doing Business As				
79	0001615665	Rye Telephone Company, Inc.	ghValley.net	894	2641	1	2
80	0004310769	S&T Telephone Coop Association. Inc.	S&T Telephone Coop Assoc Inc	22	29		
81	0005061775	San Isabel Telecom, Inc.	San Isabel Telecom, Inc.	1360	634	1	5
82	0016136327	SECOM	SECOM			2	28
83	0018756155	Skycasters, LLC	Skycasters			1	
84	0016134751	SkyWerx Industries, LLC	SkyWerx Industries, LLC			1	
85	0017163304	Slopeside Internet, LLC	Slopeside Internet, LLC			3	
86	0005070933	South Park Telephone Company, LLC	ghValley.net			2	1
87	0003778941	Spring Creek Cable	Spring Creek Cable	225	47		1
88	0003774593	Sprint Nextel Corporation	Sprint			3	1
89	0005087457	StarBand Communications Inc.	StarBand Communications Inc.			1	
90	0001616390	Strasburg Telephone Company	TDS Telecom	111	180		1
91	0003723236	Sunflower Telephone Company	FairPoint Communications	131	123		12
92	0006945950	T-Mobile USA, Inc.	T-Mobile			8	6
93	0013430244	Time Warner Cable, LLC	Time Warner Cable	925	859		
94	0004351086	tw telecom inc.	tw telecom inc.	967	1		2
95	0005200067	Uintah Basin Electronic Telecommunications	Strata Networks	810	277		
96	0003290673	Verizon Wireless	Verizon Wireless			4	
97	0015360456	Viaero Wireless	Viaero Wireless			1	
98	0007843766	ViaSat	ViaSat Communications			2	
99	0020647715	Vision Wireless Communications	Vision Wireless Communications			4	25
100	0002748044	Vyve Broadband	Vyve Broadband	692	3		1
101	0018191155	Wifi West	Wifi West			1	20
102	0001616192	Wiggins Telephone Association	Wiggins Telephone Association	720	3769		1
103	0006275945	XO Communications, LLC	XO Communications Services, Inc. (Affiliated Entity)	863	46		
104	0015331689	Zayo Enterprise Networks, LLC	Zayo Enterprise Networks, LLC				353
105	0018186395	Zero Error Networks, LLC	Zero Error Networks, LLC			1	19
106	0012579652	Zirkel Wireless, LLC	Zirkel Wireless, LLC			3	20
107	0019898303	Cogent Communications, Inc.	Cogent Communications, Inc.	51 Service Address			
108	0003723822	Level 3 Communications, LLC	Level 3 Communications, LLC	2261 Service Address			
109	0016136327	SECOM	SECOM	480 Service Address			
110	0014817357	Unite Private Networks, LLC	Unite Private Networks	516 Service Address			
111	0015331689	Zayo Enterprise Networks, LLC	Zayo Enterprise Networks, LLC	402 Service Address			

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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	9 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 7	2 to 5
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 6
90	Electric Power Lines	3 to 5	2 to 5
0	All Other	3 to 11	2 to 11

Speed Tier Codes	
1	< 200 kbps.
2	>200 kbps, < 768 kbps.
3	> 768 kbps, < 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.

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Distinct Speed Tiers Provided

Maximum Advertised Speed				Typical Speed			
Technology	Download	Upload	Freq.	Technology	Download	Upload	Freq.
10	3	2	298	10	3	2	7232
10	3	3	4392	10	3	3	4392
10	4	2	5954	10	4	2	7974
10	4	3	14113	10	4	3	13233
10	5	2	12451	10	5	2	20986
10	5	3	10879	10	5	3	13241
10	6	2	146	10	6	3	9972
10	6	3	27549	10	7	3	37532
10	6	4	1181	10	7	4	46309
10	6	5	111	10	8	4	223
10	7	3	41147	10	8	5	11869
10	7	4	49131	10	8	7	23704
10	7	5	7989	10	ZZ	ZZ	18271
10	8	4	350	20	4	4	2466
10	8	5	11869	20	5	5	74799
10	8	7	23704	20	6	5	1499
10	8	8	293	20	6	6	1
10	9	7	2995	20	7	7	1942
20	3	2	41	20	ZZ	ZZ	4442
20	3	3	316	30	4	4	2210
20	4	4	6809	30	5	5	74787
20	5	5	6900	30	7	7	1437
20	6	3	35	30	ZZ	ZZ	24334
20	6	5	184	40	9	5	270
20	6	6	53461	40	9	9	2
20	7	3	54	40	ZZ	ZZ	71100
20	7	7	6922	41	5	2	93
20	8	8	2726	41	6	4	272
20	8	8	2726	41	6	5	19522
30	3	3	242	41	7	2	772
30	4	4	3930	41	7	4	266
30	5	4	5	41	ZZ	ZZ	3179
30	5	5	75748	50	6	5	878
30	6	5	1499	50	7	3	6
30	6	6	213	50	7	4	2731
30	7	7	3206	50	7	6	17
30	8	8	112	50	7	7	72
30	9	9	12	50	8	5	23
40	9	5	270	50	8	6	23
40	9	7	3898	50	8	7	21
40	9	9	4	50	9	7	18
40	10	7	67202	50	9	8	3419
41	4	2	695	50	9	9	9

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Distinct Speed Tiers Provided

Maximum Advertised Speed				Typical Speed			
Technology	Download	Upload	Freq.	Technology	Download	Upload	Freq.
41	4	3	4	50	10	9	114
41	4	4	11	50	10	10	2261
41	5	2	95	50	11	11	80
41	5	3	5	50	ZZ	ZZ	16678
41	5	4	2	60	3	2	2
41	5	5	91	60	4	2	1
41	6	4	1	60	ZZ	ZZ	3
41	6	5	21213	70	2	2	1
41	7	2	550	70	3	2	2
41	7	3	525	70	3	3	2
41	7	4	2322	70	4	3	2
41	7	5	8	70	4	4	1
50	3	3	3	70	5	2	3
50	4	4	6	70	5	3	3
50	5	2	15	70	5	4	2
50	5	3	40	70	6	4	4
50	5	5	4	70	6	5	2
50	6	2	42	70	6	6	2
50	6	3	2266	70	7	5	3
50	6	6	12	70	7	6	2
50	7	3	78	70	7	7	3
50	7	4	3554	70	ZZ	ZZ	29
50	7	5	3	71	3	3	4
50	7	7	350	71	4	2	1
50	8	3	1191	71	5	3	1
50	8	7	1590	71	6	3	1
50	8	8	3614	71	6	4	2
50	9	7	1619	71	6	5	1
50	9	8	924	71	7	5	2
50	9	9	8387	71	ZZ	ZZ	5
50	10	9	4752	80	2	2	2
50	10	10	720	80	3	2	3
50	11	10	51	80	5	3	3
50	11	11	9850	80	6	3	2
60	4	2	1	80	6	4	1
60	5	3	3	80	6	5	2
60	7	4	1	80	7	5	2
60	7	5	1	80	ZZ	ZZ	17
70	3	2	2				
70	3	3	1				
70	4	3	3				
70	4	4	1				

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Distinct Speed Tiers Provided

Maximum Advertised Speed			
Technology	Download	Upload	Freq.
70	5	2	2
70	5	3	4
70	5	4	2
70	5	5	2
70	6	2	1
70	6	3	1
70	6	4	4
70	6	5	2
70	6	6	5
70	7	3	2
70	7	4	1
70	7	5	7
70	7	6	6
70	7	7	13
71	3	3	2
71	4	2	1
71	4	3	1
71	5	3	2
71	6	3	1
71	6	5	2
71	6	6	1
71	7	3	1
71	7	4	2
71	7	5	2
71	7	7	3
80	7	7	3
80	3	2	5
80	4	2	2
80	4	3	2
80	5	3	1
80	5	4	5
80	6	4	2
80	7	5	5
80	7	6	2