Colorado Broadband Data & Development Program

April 1st, 2016 Data Delivery Report

The State of Colorado's first broadband mapping project began when the General Assembly passed SB08-215 and SB09-162, which directed the Office of Information Technology (OIT), working in consultation with the Governor's Innovation Council, to identify broadband service areas within the State and to produce a geographically-based statewide inventory of broadband availability. The resulting data and maps were intended to provide the starting point for developing a strategy for broadband service deployment to the state's underserved areas and to begin the discussion of how to increase broadband adoption and usage in those areas that are currently served. The project also included the development of an interactive web service allowing citizens to toggle on and off broadband technology and speed layers, as well as demographic information, to document any inaccuracies in the current data and to enter their address and determine the providers in their area.

Purpose of this Report

The report provides details about the various techniques used by OIT to collect data, validate, process, and publish coverage area results. The resulting broadband coverage areas are made available to providers in the form of map books as well as to the general public by publishing the results on the Broadband Mapping Application located at http://broadband.co.gov/.

Status of Data Collection

The broadband mapping and development efforts began with a third party contractor through a data collection contract signed on March 22, 2010. After the October 2014 data submission, the State Broadband Initiative grant ended and the program was picked up by the State of Colorado. OIT continues to make efforts to improve broadband collection and its broadband database.

For the past nine cycles, OIT's efforts to track down broadband providers have yielded positive results. Numerous broadband providers have been identified and have participated in our data collection efforts. Between October 2015 and April 2016, 5 new potential broadband providers were identified, 3 of those submitting data, 1 not qualifying as a broadband provider, and 1 with no data submission. Currently, 142 providers have been identified: 12 do not meet broadband requirements, 33 reported 'No Data Change', 68 submitted new data changes or needed corrections, 8 requested we contact the FCC for data, 6 are non-responsive, and 8 are out of business. Effort to identify all broadband providers in Colorado is ongoing as we continue to strive to improve our database.

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

Service Providers	April 2016
Potential Identified Providers	**142**
Data Sets Delivered	112
Non-Responsive Providers	6
Not a Broadband Provider	12
Contact FCC	8
Will Not Provide Data	4
Out of Business	8

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

Service Provider Updates	April 2016
New Providers	4
Updated Data	67
Responded "No Data Change"	33
Contact FCC For Data	8
Removed Coverage; Non-responsive	0
Removed coverage Provider request	1
Data Sets in Public Database	**111**

As mentioned in the previous delivery cycles, a GIS team member was hired to specifically focus on the accuracy of the Community Anchor Institution database; with regards to activity, location, and broadband speed. Additionally, 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. OIT 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. OIT has expanded the number of CAIs submitting speed test information between October 2013 and this current dataset. The following table shows the number of community anchor institutions that have been identified in the state:

Community Anchor Institutions	April 2016		
	Identified	Collected	Includes Speed Test
Cat. 1 - School K -12	2374	2374	999
Cat. 2 - Library	265	265	120
Cat. 3 - Medical/Healthcare	1001	1001	249
Cat. 4 - Public Safety	1825	1825	587
Cat. 5 - University/College	78	78	20
Cat. 6 - Other Government	1026	1026	301
Cat. 7 - Other non-Government	354	354	8
TOTALS	**6923**	**6923**	**2284**

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 2015 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. Crowd Sourcing

1. Automated Validation

OIT has been developing and improving automated validation scripts since its first data delivery processed in house in April 2011. OIT runs the scripts it has developed on the final dataset post processing in every delivery cycle. The data delivery includes documentation demonstrating that the data has passed the CBMP standards set in place and met all necessary requirements.

OIT's automated scripts:

- Verifies 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 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
- 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 major changes between the October 2015 and the April 2016 delivery:

- Hiring of two additional GIS Technicians focusing on broadband.
- The State of Colorado's commitment to refine and further develop the broadband mapping program.
- Changes and increase in detail of data submission requirements for broadband providers.
- Greater emphasis on improving price data associated with each speed package.
- Differentiating between residential and commercial broadband coverage to better understand the services of broadband providers.
- Converting new and existing wireline data to an updated Public Land Survey System (PLSS) QQ section grid.

The coverage in this delivery reflects the increase or decrease in service from these changes. We have observed an increase in new data for all three types of features between October 2015 and April 2016. In turn, our data classified as "no change" has decreased across the board. We've also added the category of "Contact FCC for data," as we now have the ability to download provider data that has been submitted to the FCC. Providers that fall under this scenario have previously been categorized as no data change.

The following table shows the change in the number of features from October 2015 to April 2016:

	PLSS QQ		Wireless Service		Middle Mile	
	Number of Providers	% Number of Features Changed *	Number of Providers	% Number of Features Changed	Number of Providers	% Number of Features Changed
New Providers	3	%	2	0%	2	0
Received new data	41	+5.88%	36	+22.45%	46	+69.58%
Contact FCC for data	3	+101.94%	5	-11.11%	2	-12.5%
No Changes	15	-53.9%	24	-5.8%	24	-31.6%

3. Visual Review

OIT routinely reviews the coverage areas of new service providers and those with updates or changes to coverage in preparation for each delivery. After the October 2014 data delivery, in an effort to prevent providers from exaggerating coverage, PLSS quarter-quarter sections and address point data are used in conjunction with imagery to verify and reduce areas of claimed coverage over undeveloped land. PLSS quarter-quarter sections with no address points and no evident development based on imagery were selected and removed from each provider's coverage. Wireless tower locations provided in the April 2016 coverage were inspected using aerial imagery in order to identify existing towers on the surface. Where towers could not be identified, OIT 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. Starting with the April 2015 delivery, address level data is requested of all providers in order for OIT to better verify and represent accurate provider coverage. For landline providers, submitted location data is used to identify which PLSS quarter-quarter sections are included in their respective coverage. With wireless providers, address data and imagery are used to verify that the claimed coverage areas are spread over developed land. A confidence rating was implemented in order to indicate both the quality of the data received from providers, and how accurate the coverage is believed to be. For each provider, the confidence rating is based on the quality of data submitted by provider, as well as the resulting accuracy of the coverage. A more accurate coverage model was created for all the providers in compliance with our requests.

4. Website Validation

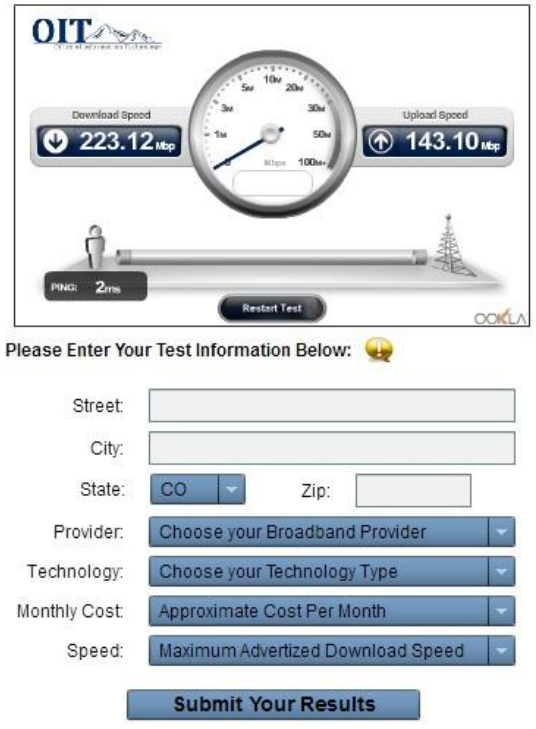
After the October 2014 data delivery, our team also extended validation efforts to provider website analysis. For all providers having a website, the broadband mapping team visited each site to validate the provider's maximum advertised download and upload speeds in megabytes per second (Mbps), as well as the price associated with each speed. Previous data deliveries outlined by the NTIA included a speed tier format; however, this method is no longer preferred. Additionally, OIT documented inconsistencies between the data deliveries and the advertised speeds for internal processing. The team created map books for each provider and has emailed those directly to each provider for their review.

5. Feedback Loop

As a routine part of our processing work flow, the mapping team gave all service providers the opportunity to review the final geospatial representation of their data in the form of map books and/or on the Colorado Broadband Mapping Application (http://broadband.co.gov/). Additionally, in the emails the mapping team asked for follow-up conversations to create a dialogue between providers and the mapping team to discuss the inconsistencies found in the information reported on their web sites and coverage submitted for the data delivery.

6. 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 mapping application (http://broadband.co.gov/) 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. OIT is continuing efforts to collect speed tests using the aforementioned methods, which are used to compare against provider data.

Summary of Process

During the first two years of the program, the OIT contracted a third party business (Critigen) to perform data processing. Starting with the April 1, 2011 delivery, the OIT hired staff and brought this process in-house. The OIT continued 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 completion of the FCC Broadband Initiative posed many challenges in 2015 to continue mapping state broadband coverage. The State of Colorado has and will continue to map broadband coverage. The NTIA previously designated that all wireline broadband coverage be represented in the form of census blocks from the US Census Bureau. OIT has decided to move away from this unit of representation for broadband purposes based on numerous conversations with providers, surveys, and general complaints about how the data is being represented. Therefore, the Governor's Office of Information Technology will use the Public Land Survey System at the Quarter-Quarter section to map wireline coverage areas. The new geographic unit has increased the level of detail to which we are able to represent coverage areas. Imagery and address location data is used in conjunction with this geographic unit to ensure accuracy and reduce overrepresentation. 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_2015_10_01.pdf).

The broadband mapping team 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. OIT reaches out to providers who have not previously submitted data, in order to create a more comprehensive state dataset.
3. OIT also contacts each currently participating provider to allow them to report data changes or confirm the existing data is still accurate.
4. OIT 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. Additional details are located in the Subscriber Data Requirements located in the Broadband Processing Guide's Call for Data packet.
5. Beginning with the April 2015 cycle, data requirements have changed. New data requirement documents are emailed to providers with OIT's initial outreach package.

6. Numerous providers have expressed concern due to the new requirement of subscriber level data and location for all provider types. OIT enforces a strict confidentiality policy and offers Non-Disclosure Agreements in order to maintain subscriber anonymity and offer assurance to providers.

Data Processing

For the April 2016 delivery, OIT processed three types of data: wireless, middle mile, and landline. All data is processed in accordance with the Broadband Geoprocessing Guide, which includes loading processed data into the mapping team's Confidence Template, QC Tools, and Staging tool in order to standardize datasets.

Wireless

- Wireless data submitted as a service coverage area is re-processed for accuracy.
- Wireless data submitted as tower locations is processed using signal propagation software to create a coverage plot.
- Statewide and provider submitted address data is used to verify coverage plots and their proximity to developed areas.
- Confidence values are assigned to each wireless coverage based on quality of data submitted by provider and assessment of accuracy

Middle Mile

- Middle mile locations reported by the providers using either addresses or coordinates was geocoded and processed following the guide lines.
- Various validation methods are implemented to check the data accuracy, as described in "Validation and Verification" section of this document.
- The OIT requested pricing information but unfortunately because of uncertainty with the FCC 477 Permit requirements many providers acquiesced.
- Representing typical speeds continues to be an issue, as less than two thirds of the providers report typical speed information.

Wireline or Landline

- Previously, wireline data was divided into three separate categories: census blocks less than two square miles, census blocks greater than two square miles was represented as road segments, and service address points. Currently, these forms of data submission are all processed into the PLSS QQs.
- For providers who did not submit new data or claimed no data changes, PLSS data from the October 2015 cycle was converted to the updated PLSS grid.
- Submitted subscriber data was used to generate PLSS coverage in the case of providers which submitted required level data.
- In both cases, statewide address data is used to filter and verify which PLSS quarter-quarter sections in each provider's coverage feature developed (buildings, homes, establishments etc.) land. Imagery allows us to further ensure the provider coverage is representative of developed areas. Address data is not available for several counties. Imagery analysis of PLSS coverage is particularly helpful for assessing provider coverage which falls within those counties.

- Confidence values are assigned to each provider's PLSS coverage based on the quality of data submitted; address data presence, and imagery analysis.

TABLES

Colorado

Data Summary

File Summary

File Type	Number of Records
Total Records in all Files	**209411**
PLSS Quarter Quarters	**200396**
Wireless	**133**
Community Anchor Institutions	**6923**
Middle Mile	**1959**
Metadata Provided for Geospatial Data	**Yes**

File Type	Number of Records
Number of ISPs Provided	**112**

Provider Information

Colorado

PLSS Quarter Quarters

Data Type	Code	Data Element	Count	%
Records Details		Total Records	1588803	
		PLSS with Broadband	200396	
		(with & without broadband)		
		Total Census Blocks in the State (with & without broadband)	201062	
Services Provider Details		Number of Distinct Providers	62	
		Number of Distinct "Doing Business As"	59	
		Number of Distinct FRN	62	
Technology	10	Asymmetric xDSL	95861	47.84%
	11	ADSL2/ADSL2+	645	0.322%
	12	VDSL	22	0.0109%
	20	Symmetric xDSL	12310	6.143%
	30	Other Copper Wireless	11365	5.67%
	40	Cable Modem-DOCSIS 3.0	63435	31.65%
	41	Cable Modem-Other	2060	1.03%
	50	Optical Carrier/Fiber	14698	7.33%
	60	Satellite	0	0%
	70	Terrestrial Fixed Wireless-Unlicensed	0	0%
	71	Terrestrial Fixed Wireless-Licensed	0	0%
	80	Terrestrial Mobile Wireless	0	0%
	90	Electrical Power Line	0	0%
	0	Other	0	0%
Max. Advertised Download Speed	2	> 200 kbps, < 768 kbps	396	0.197%
	3	> 768 kbps, < 1.5 mbps.	226	0.113%
	4	> 1.5 mbps, < 3 mbps.	15667	7.82%
	5	> 3 mbps, < 6 mbps.	10625	5.302%
	6	> 6 mbps, < 10 mbps.	20186	10.07%
	7	> 10 mbps, < 25 mbps.	27662	13.803%
	8	> 25 mbps, < 50 mbps.	22931	11.44%
	9	> 50 mbps, < 100 mbps.	4460	2.23%
	10	> 100 mbps, < 1 gbps.	90701	45.261%
	11	> 1 gbps.	7542	3.76%
Provider Type	1	Provider		
	2	Reseller		
End User Name	1	Residential	51255	25.58%
	2	Business	64927	32.39%
	3	Government	0	0%
	5	Residential/Business Identical	84214	42.02%

Data Type	Code	Data Element	Count	%
Typical Download Speed	3	>= 768 kbps. < 1.5 mbps.	4	0.00199%
	4	>= 1.5 mbps. < 3 mbps.	42	0.021%
	5	>= 3 mbps. < 6 mbps.	673	0.336%
	6	>= 6 mbps. < 10 mbps.	109	0.0544%
	7	>= 10 mbps. < 25 mbps.	1272	0.635%
	8	>= 25 mbps. < 50 mbps.	0	0%
	9	> 50 mbps, < 100 mbps.	10	0.00499%
	10	> 100 mbps, < 1 gbps.	239	0.12%
	11	> 1 gbps.	0	0%
		ZZ "null"	198047	98.83%
Max. Advertised Upload Speed	1	< 200 kbps	91	0.045%
	2	>200 kbps, < 768 kbps.	8122	4.053%
	3	>= 768 kbps. < 1.5 mbps.	36501	18.21%
	4	> 1.5 mbps, < 3 mbps.	26002	12.98%
	5	> 3 mbps, < 6 mbps.	14880	7.43%
	6	> 6 mbps, < 10 mbps.	10493	5.24%
	7	> 10 mbps, < 25 mbps.	64702	32.29%
	8	> 25 mbps, < 50 mbps.	27653	13.8%
	9	> 50 mbps, < 100 mbps.	3508	1.751%
	10	> 100 mbps, < 1 gbps.	1180	0.588%
	11	> 1 gbps.	7264	3.62%
Typical Upload Speed	2	>200 kbps, < 768 kbps.	29	0.0145%
	3	> 768 kbps, < 1.5 mbps.	667	0.333%
	4	> 1.5 mbps, < 3 mbps.	1368	0.683%
	5	> 3 mbps, < 6 mbps.	0	0%
	6	> 6 mbps, < 10 mbps.	0	0%
	7	> 10 mbps, < 25 mbps.	36	0.0179%
	8	> 25 mbps, < 50 mbps.	0	0%
	9	> 50 mbps, < 100 mbps.	10	0.00499%
	10	> 100 mbps, < 1 gbps.	239	0.12%
	11	> 1 gbps.	0	0%
		ZZ "null"	198047	98.83%

Wireless

Data Type	Code	Data Element	Count	%
Record		Total Records	133	
Services Provider Details		Number of Distinct Providers	67	
		Number of Distinct "Doing Business As"	66	
		Number of Distinct FRN	65	
Technology	10	Asymmetric xDSL	0	0.00%
	20	Symmetric xDSL	0	0.00%
	30	Other Copper Wireless	0	0.00%
	40	Cable Modem-DOCSIS 3.0	0	0.00%
	41	Cable Modem-Other	0	0.00%
	50	Optical Carrier/Fiber	0	0.00%
	60	Satellite	6	4.51%
	70	Terrestrial Fixed Wireless-Unlicensed	87	65.41%
	71	Terrestrial Fixed Wireless-Licensed	8	6.02%
	80	Terrestrial Mobile Wireless	32	24.06%
	90	Electrial Power Line	0	0.00%
	0	Other	0	0.00%
Max. Advertised Download Speed	3	> 768 kps, < 1.5 mbps.	8	6.02%
	4	> 1.5 mbps, < 3 mbps.	11	8.271%
	5	> 3 mbps, < 6 mbps.	20	15.04%
	6	> 6 mbps, < 10 mbps.	14	10.53%
	7	> 10 mbps, < 25 mbps.	54	40.6%
	8	> 25 mbps, < 50 mbps.	10	7.52%
	9	> 50 mbps, < 100 mbps.	5	3.76%
	10	> 100 mbps, < 1 gbps.	9	6.77%
	11	> 1 gbps.	2	1.504%
Spectrum	1	800 Mhz Spectrum Used	5	3.76%
	2	700 Mhz Spectrum Used	5	3.76%
	3	1900 Mhz Spectrum Used	13	9.77%
	4	1700 Mhz Spectrum Used	10	7.52%
	5	2500 Mhz Spectrum Used	6	4.51%
	6	Unlicensed Spectrum Used	84	63.16%
	7	Specialist Mobile Radio Service	2	1.504%
	8	Wireless Communication Service	2	1.504%
	9	Satilite	6	4.51%

Data Type	Code	Data Element	Count	%
Typical Download Speed	2	>200 kps, < 768 kps.	3	2.26%
	3	> 768 kps, < 1.5 mbps.	2	1.504%
	4	> 1.5 mbps, < 3 mbps.	1	0.752%
	5	> 3 mbps, < 6 mbps.	10	7.52%
	6	> 6 mbps, < 10 mbps.	11	8.27%
	7	> 10 mbps, < 25 mbps.	5	3.76%
	8	> 25 mbps, < 50 mbps.	3	2.26%
	9	> 50 mbps, < 100 mbps.	0	0%
	10	> 100 mbps, < 1 gbps.	0	0%
	11	> 1 gbps.	0	0%
		ZZ "null"	98	73.68%
Max. Advertised Upload Speed	2	>200 kps, < 768 kps.	7	5.26%
	3	> 768 kps, < 1.5 mbps.	19	14.29%
	4	> 1.5 mbps, < 3 mbps.	33	24.81%
	5	> 3 mbps, < 6 mbps.	29	21.8%
	6	> 6 mbps, < 10 mbps.	14	10.53%
	7	> 10 mbps, < 25 mbps.	18	13.53%
	8	> 25 mbps, < 50 mbps.	5	3.76%
	9	> 50 mbps, < 100 mbps.	3	2.26%
	10	> 100 mbps, < 1 gbps.	3	2.26%
	11	> 1 gbps.	2	1.504%
Typical Upload Speed	2	>200 kps, < 768 kps.	4	3.01%
	3	> 768 kps, < 1.5 mbps.	13	9.77%
	4	> 1.5 mbps, < 3 mbps.	6	4.51%
	5	> 3 mbps, < 6 mbps.	5	3.76%
	6	> 6 mbps, < 10 mbps.	6	4.51%
	7	> 10 mbps, < 25 mbps.	1	0.752%
	8	> 25 mbps, < 50 mbps.	0	0%
	9	> 50 mbps, < 100 mbps.	0	0%
	10	> 100 mbps, < 1 gbps.	0	0%
		ZZ "null"	98	73.68%

Colorado

Community Anchor Institution

Data Type	Code	Data Element	Count	%
Record Details		Total Records	6923	
Anchor Category	1	School-K through 12	2374	34.29%
	2	Library	265	3.83%
	3	Medical/healthcare	1001	14.46%
	4	Public safety	1825	26.36%
	5	University, college, other post-secondary	78	1.13%
	6	Other community support-/gov't	1026	14.82%
	7	Other community support-non-/gov't	354	5.11%
Technology	10	Asymmetric xDSL	975	14.08%
	20	Symmetric xDSL	43	0.621%
	30	Other Copper Wireless	1703	24.59%
	40	Cable Modem-DOCSIS 3.0	39	0.563%
	41	Cable Modem-Other	151	2.18%
	50	Optical Carrier/Fiber	1948	28.14%
	60	Satellite	35	0.506%
	70	Terrestrial Fixed Wireless-Unlicensed	35	0.506%
	71	Terrestrial Fixed Wireless-Licensed	100	1.44%
	80	Terrestrial Mobile Wireless	1	0.0144%
	90	Electrical Power Line	0	0%
	0	Other	0	0%
		-9999 "null"	1893	27.34%
Max. Advertised Download Speed	1	< 200 kbps.	4	0.0577%
	2	>200 kbps, < 768 kbps.	50	0.722%
	3	> 768 kbps, < 1.5 mbps.	190	2.7444%
	4	> 1.5 mbps, < 3 mbps.	229	3.308%
	5	> 3 mbps, < 6 mbps.	389	5.62%
	6	> 6 mbps, < 10 mbps.	304	4.39%
	7	> 10 mbps, < 25 mbps.	623	8.99%
	8	> 25 mbps, < 50 mbps.	270	3.9%
	9	> 50 mbps, < 100 mbps.	199	2.874%
	10	> 100 mbps, < 1 gbps.	24	0.3467%
	11	> 1 gbps.	2	0.0288%
		ZZ "null"	4639	67.008%

Data Type	Code	Data Element	Count	%
Max. Advertised Upload Speed	1	< 200 kbps.	19	0.2744%
	2	>200 kbps, < 768 kbps.	265	3.827%
	3	> 768 kbps, < 1.5 mbps.	250	3.611%
	4	> 1.5 mbps, < 3 mbps.	283	4.087%
	5	> 3 mbps, < 6 mbps.	447	6.456%
	6	> 6 mbps, < 10 mbps.	403	5.821%
	7	> 10 mbps, < 25 mbps.	406	5.864%
	8	> 25 mbps, < 50 mbps.	130	1.877%
	9	> 50 mbps, < 100 mbps.	54	0.78%
	10	> 100 mbps, < 1 gbps.	23	0.332%
	11	> 1 gbps.	2	0.0288%
		ZZ "null"	4641	67.04%
Y/N Broadband Service	Y	Yes-Subscribers to Service	4964	71.703%
	N	No-Does Not Subscribers to Service	391	5.65%
	U	Unknown	1568	22.65%
Lat/Long Accuracy	1	Lat/Long falls within the State	6923	
	2	Total Lat/Long	6923	100%
Anchor Names		Total Count Anchors Names	6923	
		Distinct Count of Anchor Names	6677	

			Count	BB Info
Community Anchor Institution Category Count with Broadband Information	1	School-K through 12	2374	2027
	2	Library	265	247
	3	Medical/healthcare	1001	664
	4	Public safety	1825	1465
	5	University, college, other post-secondary	78	54
	6	Other community support-/gov't	1026	498
	7	Other community support-non-/gov't	354	9
		Totals	6923	4964

Public WIFI	Y	Yes	425
	N	No	4816
	U	Unknown	1682

Colorado

Middle Mile

Data Type	Code	Data Element	Count	%
Record Details		Total Records	1959	
Services Provider Details		Number of Distinct Providers	73	
		Number of Distinct "Doing Business As"	69	
		Number of Distinct FRN	72	
Ownership	0	Owned	1196	61.05%
	1	Leased	763	38.95%
Facility Capacity	1	Multiple T1's and less than 40 mbps.	951	48.54%
	2	Greater than 40 mbps. and less than 150 mbps.	171	8.73%
	3	Greater than 150 mbps. and less than 600 mbps.	251	12.81%
	4	Greater than 600 mbps. and less than 2.4 gbps.	86	4.39%
	5	Greater than 2.4 gbps. and less than 10 gbps.	1	0.051%
	6	Greater than 10 gbps	499	25.47%

Data Type	Code	Data Element	Count	%
Facility Type	1	Fiber	689	35.17%
	2	Copper	4	0.204%
	3	Hybrid Fiber Coax (HFC)	1	0.051%
	4	Wireless	1265	64.57%
		N/A "null"	0	0%
Lat / Long		# of Lat/Long in State	1959	100%
		Total Lat/Long	1959	
Elevation		Number of Data Points	1086	
		Lowest Elevation	0	
		Highest Elevation	350	

Colorado

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.