

Verification Analysis of the National Broadband Map

*Spotlight
on
Arizona*

April 25th, 2011

Executive Summary

In February of this year, the National Telecommunications and Information Administration (NTIA) released the first National Broadband Map. The need for an accurate nationwide map of broadband connectivity is unquestioned. Knowing where broadband is and where it is not is vital to planning our broadband future. FCC Chairman Julius Genachowski said, “The release of the National Broadband Map, the first of its kind in the nation, is a significant milestone. This cutting-edge tool will continue to evolve with the help of new data and user feedback. It will provide consumers, companies and policymakers with a wealth of information about broadband availability, speeds, competition and technology, and help Americans make better informed choices about their broadband services.”

The release of the public database has invited a ton of feedback, some positive but much more negative. This makes sense. By making this information public, it is now easy to point out where the map is wrong, whereas it is not overly newsworthy or exciting to talk about where the map is right. Whichever side of that discussion, the creation of this initial map is an incredibly valuable first step.

As a part of this evolving need for accurate broadband data and information, we created Broadband Scout in 2009. At that time, we were using Scout to help regional broadband carriers and municipalities with their NOFA grant requests. Scout is now being used by states for their broadband mapping verification needs, as well as broadband providers of all sizes to measure availability, market share and actual upload and download speed.

Unlike the NTIA map which was generated primarily as the result of collecting coverage data and advertised speeds directly from the carriers, Scout was created by looking at over a half a billion consumer internet transactions that link the consumer’s physical address to their internet provider through their Internet Protocol (IP) address. In short, Scout is an independent survey of internet connectivity that today covers approximately 15% of all internet households in the country.

When we compare Scout to the NTIA map, there are some interesting differences:

- Because Scout sees raw transactions, we cannot only measure availability but usage at the most granular geographic level.
- Scout sees all internet providers, including dial-up connections which are not reported to NTIA.
- When we measure speed, we are measuring actual speeds that have been measured for the IP address.
- Because we are looking at millions of transactions, Scout observes nearly every carrier as opposed to the carriers that chose to participate and send their data to the states.

With respect to how the data is collected between the carrier contributed method for NTIA versus Scout, we wanted to take look at some of the fundamental differences between the two methods. To demonstrate some of these differences, we focused on the State of Arizona’s broadband information.

Methodology

Here is a brief description of how the NTIA data was created versus Scout is created.

NTIA

- All carriers are identified for each state. Much of this information comes from the FCC's Form 477 contributed data. This is sometimes augmented with other carriers that have not reported but are known to do business in the state.
- A request is then made to these carriers to supply their coverage, type of coverage and typical download and upload speeds being delivered.
- In reporting this information, the carriers were asked to report their information by Census Block Number if the block number is 2 square miles or less and by street segment if the census block number is greater than 2 square miles.
- Once all participating carriers supply the information to the state, the state then verifies the accuracy of the carrier contributed data through tools like Scout, surveys or other verification methods.
- Once the data has been verified, it is then sent to the NTIA who compiles this information to a national level.
- The information for this study was from the recently contributed (2010) carrier data.

Broadband Scout

- Scout is the result of collecting and analyzing over a half a billion internet transactions from all over the country.
- These transactions come from hundreds of sources including e-commerce transactions, subscription services, and various other sources where the consumer submits their address information and the source captures the consumer's IP address which leads to the carrier.
- Scout then discriminates between residential carriers and business carriers.
- Analysis is performed to determine the boundary files for each carrier using technologies such as wire center information, Geo-location services, etc.
- The transactional information captured the most recent address seen when capturing the carrier.
- For this study, we analyzed all Scout data for 2010.

For both NTIA and Scout data, we can observe, measure and compare the data at various geographic levels. For illustration purposes, most of the information was compared at the Census Block Group Level. This allows us to speak to the differences in a meaningful way as well as effectively portraying this information in maps. In performing the analysis, we looked at the following questions:

- At a national level, what percentage of carriers contributed to the NTIA process?
- For the state of Arizona, what carriers contributed to the NTIA process and what carriers did we see in Scout?

- When looking at the Census Block Group, what differences do we see between NTIA and Scout?
- For some of the largest carriers, what differences do we see between NTIA and Scout when looking at Census Block Groups covered or available?
- What do the NTIA and Scout maps look like when considering availability?
- What do the NTIA and Scout maps look like when considering speed?
- What conclusions can we draw?

Results

State Participation Rates

The primary factor we looked at was the percentage of carriers that contributed to the NTIA process for each state and territory. This is not the easiest of tasks as the denominator is not overly straightforward. Each state compiled their own listing of carriers from which they attempted to collect data. They were then asked to comment on which providers “Provided Data” and which “Did Not Provide Data”. Unfortunately, some states did not follow this path and only reported on carriers that provided data and did not indicate those that did not provide data. In other states, they listed carriers that were out of business or repeats. Nevertheless, when we consider participation rates with this definition, here is what we see:

State	Provided Data	Total Listed	Participation %	State	Provided Data	Total Listed	Participation %
IN	131	131	100%	NE	73	94	78%
IL	158	158	100%	ID	77	101	76%
MS	45	45	100%	WA	79	105	75%
CA	76	76	100%	AZ	39	53	74%
DE	20	20	100%	OR	86	118	73%
GA	69	69	100%	WY	39	54	72%
VI	4	4	100%	NY	77	107	72%
NH	21	21	100%	MT	32	45	71%
HI	7	7	100%	PA	86	124	69%
UT	46	48	96%	OK	75	115	65%
SD	44	46	96%	MA	27	43	63%
VT	36	38	95%	ME	31	53	58%
IA	234	247	95%	KY	62	107	58%
NJ	30	32	94%	WV	26	46	57%
SC	64	69	93%	FL	38	70	54%
CT	30	33	91%	NC	63	118	53%
AR	67	74	91%	RI	20	39	51%
AK	19	21	90%	PR	8	16	50%
NV	50	56	89%	DC	26	53	49%
TN	87	98	89%	AL	44	91	48%
ND	38	43	88%	LA	49	105	47%
MN	124	142	87%	NM	35	75	47%
KS	88	101	87%	MD	41	100	41%
MI	126	147	86%	CO	62	158	39%
WI	129	153	84%	MO	81	230	35%
OH	138	166	83%	VA	36	132	27%
TX	180	224	80%	Total	3,373	4,621	73%

- Virginia shows the lowest participation rate of 27%.
- 9 states show a 100% participation rate. If we select on a state in particular (California), we see that they listed 76 carriers, all of which supplied data. However, when we go to the FCC Form 477 data for the state, we see that 125 carriers reported doing business in the state.
- For our spotlight state of Arizona, they show a 74% participation rate, where 39 carriers provided data out of the 53 listed.

The point of this exercise was simply to show that as we look across the states, the participation rates from carriers varies widely. This is very important in that the lower the participation rate, the less accurate the map will be.

Carriers in Arizona

Next, we focused on Arizona. As mentioned, the state listed 53 unique carriers of which 39 (or 74%) provided data. We can now begin to compare what was reported to the state versus what we see through Broadband Scout. This can be seen below.

PROVIDER	NTIA?	SCOUT?	PROVIDER	NTIA?	SCOUT?
AT&T Inc.	Y	Y	New Edge Network, Inc	Y	N
Airband Communications Inc.	Y	Y	Wi-Vod Corporation	Y	N
Accipiter Communications Inc.	Y	Y	XO Holdings, Inc.	Y	N
Baja Broadband Holding Company LLC	Y	Y	Xpressweb Internet Services Inc.	Y	N
Cable One	Y	Y	Beamspeed LLC	N	Y
Citizens Communications Company	Y	Y	Bulleri Networks LLC	N	Y
Citizens Utilities Rural Co. Inc.	Y	Y	Desert iNET LLC	N	Y
Comcast of Arizona, Inc.	Y	Y	E-Sedona	N	Y
Copper Valley Telephone, Inc.	Y	Y	Fort Mojave Telecommunications, Inc.	N	Y
Covad Communications Group, Inc	Y	Y	Gila River Telecommunications Inc.	N	Y
Cox Communications	Y	Y	Hopi Telecommunications, Inc.	N	Y
Deutsche Telekom AG (See T-Mobile USA)	Y	Y	Hughes Communications, Inc.	N	Y
Eschelon Telecom of Arizona Inc.	Y	Y	Maricopa Broadband	N	Y
Greenfield Communications Inc.	Y	Y	Phoenix Sky Harbor International Airport	N	Y
Last Mile Communications (See Wydebeam)	Y	Y	Rio Virgin Telephone Co. Inc.	N	Y
Leap Wireless International Inc.	Y	Y	Saddleback Communications	N	Y
Mediacom Arizona, LLC	Y	Y	StarBand Communications Inc.	N	Y
NPG Cable (News-Press & Gazette Co.)	Y	Y	Transcend Broadband	N	Y
Orbitel Communications, LLC	Y	Y	America Online	N	Y
PaeTec Corporation	Y	Y	Casa Grande	N	Y
Ponderosa Communications Inc. (See Table Top Tele)	Y	Y	Cellular One	N	Y
Qwest Communications International Inc.	Y	Y	Commspeed Arizona	N	Y
Simply Bits LLC	Y	Y	Duncan Valley Electric	N	Y
South Central Utah Telephone Association, Inc.	Y	Y	EAZNet	N	Y
Sprint Nextel Corporation	Y	Y	Juno	N	Y
TDS Telecommunications Corp	Y	Y	Kachina Communications	N	Y
TW Telecom of Arizona LLC	Y	Y	Red River Communications	N	Y
Time Warner Cable LLC	Y	Y	Smith Bagley	N	Y
Tohono O'odham Utility Authority	Y	Y	St. Carlos Apache Telecommunications	N	Y
Valley Connections LLC	Y	Y	Wayport	N	Y
Valley Telephone Cooperative, Inc.	Y	Y	White Mountains Online LLC	N	Y
Verizon Communications Inc.	Y	Y	Ygnition	N	Y
Western Broadband Holdings Inc.	Y	Y	Wild Blue Communications	N	Y
WildBlue Communications Inc.	Y	Y	Earthlink	N	Y
Level3 Communications, LLC	Y	N			

The first column shows whether the carrier provided data. The second column shows if Scout provided data. Here is a high level summary of the differences:

- Of the 53 listed carriers in Arizona, Scout observed 48 (or 91%).
- Scout did observe 3 of the 5 missing carriers (New Edge, XO, Level3) but does not differentiate these hosting provider's commercial traffic from residential traffic and thus does not report it.
- Of the 14 carriers that did not report to the state, Scout has the data for all these carriers.
- In addition, Scout identified 16 carriers that were not listed by the state. Some of these are dial-up only providers.
- Most of those not reporting to the state are smaller carriers.
- In all, Scout reports on 64 carriers versus the 39 carriers who reported to the state.

From the previous exercise, we can see that carrier participation rates are vitally important if we are going to continue to hang our hat on this dataset being the repository for who has broadband. This is especially critical in the most rural areas. Even though carriers such as Beamspeed and Fort Mojave Telecommunications may be smaller carriers, their information can be critically important in rural areas where they may be a choice.

Block Group Availability

Because NTIA and Scout both can demonstrate broadband availability at the Census Block Group, we summarized every block group in Arizona as to whether there was availability.

		SCOUT?		
NTIA?		NO	YES	Total
	NO	36	47	83
	YES	138	3,281	3,419
	Total	174	3,328	3,502

Here we see that overall there are 3,502 unique Census Block Groups in Arizona. When we compare NTIA coverage to Scout, we see the following:

- NTIA says that 3,419 (or 98%) of block groups are “covered”.
- Scout says that 3,328 (or 95%) of block groups are “covered”.
- NTIA and Scout agree on 3,281 block groups.
- Of the 83 block groups where NTIA says there is not coverage, Scout says 47 (or 57%) do have coverage.
- Of the 174 block groups that Scout says does not have coverage, NTIA says 138 (or 79%) are “covered”.

Of course, since we see the raw transactional data in Scout, we can begin to look at where NTIA disagrees with Scout at some actual addresses.

NTIA says NO | Scout says YES

We selected an address where Scout showed coverage and NTIA said no coverage exists. The address is located on Acoma Blvd in Lake Havasu City, AZ. The Census Block Group is 6040159534001. NTIA does not indicate any service. When we look at Scout, we see that this particular household has a Frontier telephone number and has a Frontier email address (frontier.net). Next, we went out to Frontier’s website and submitted the address. Frontier responded that they offer service to this address.

NTIA says YES | Scout says NO

We selected an address where NTIA reports coverage and Scout does not. The address is on East County 11 Street in Wellton, AZ. The Census Block Group number is 040270112001117. In the NTIA data, Qwest reports that service is available. In Scout, we see dozens of transactions in the block group, none of which indicate the availability of broadband. When we go to the Qwest website and submit this address, Qwest responded that they do not provide service.

This analysis underscores the importance of the need for ongoing verification of carrier contributed data. While we see that most of the time (94%) Scout corroborates the NTIA data, we also see that sometimes they are in disagreement. Once again, this becomes even more important in the smaller rural areas where broadband is less likely to be available.

To take this one step further, we looked at some of the largest carriers in the state. In doing so, we summarized the number of unique Census Block Groups reported to the state contrasted with the number that we observe in Scout.

Provider	Scout Block Groups	NTIA Block Groups	DIFFERENCE (Scout - NTIA)	% DIFF
Cox Communications	2764	2614	150	5.7%
QWEST	3015	3146	-131	-4.2%
FRONTIER AND CITIZENS	157	147	10	6.8%
NPG CABLE	189	83	106	127.7%
CABLE ONE	180	36	144	400.0%
Time Warner Cable	369	393	-24	-6.1%
Mediacom Communications Corp	86	74	12	16.2%

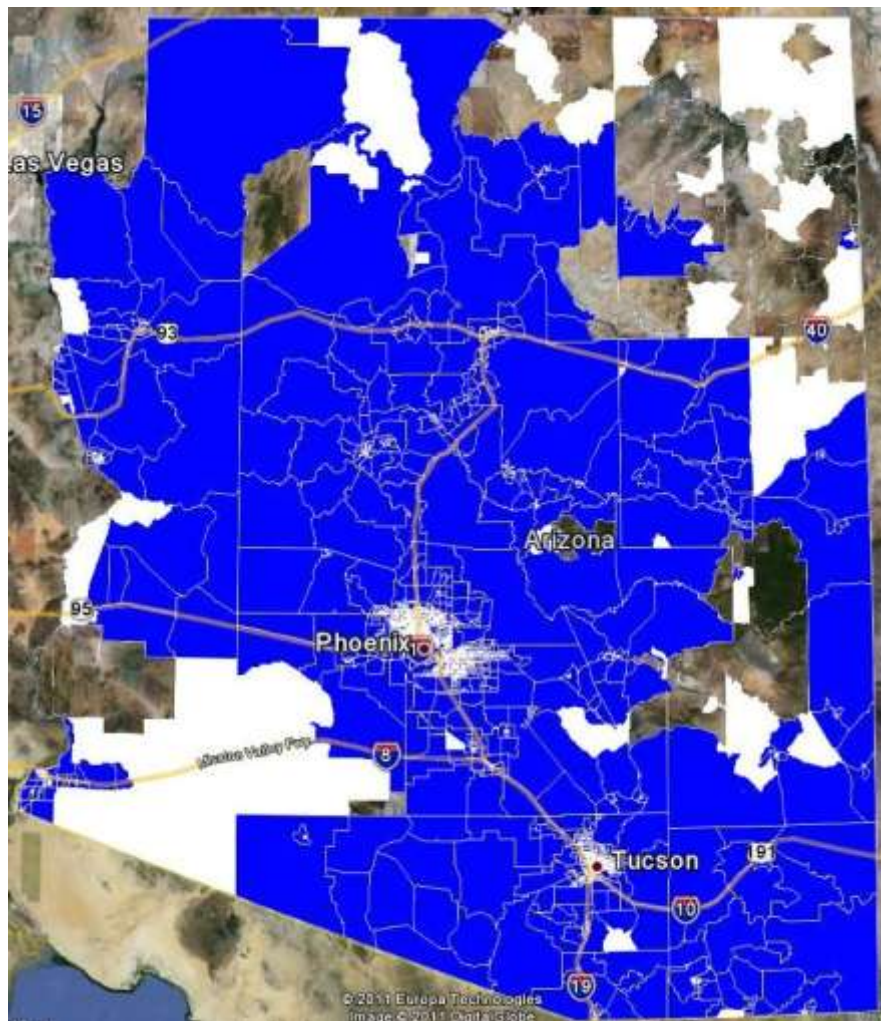
- For 4 of these 6 select carriers we see that what the carrier reported is fairly close to what Scout reports. For example, Cox Communications reports that they cover 2,614 unique block groups, while Scout says Cox covers 2,764 unique block groups. This is an overall difference in number of block groups of 5.7%.
- Likewise, Qwest, Frontier and Time Warner differences are under 10%.
- NPG Cable and Cable One stand out with a 128% and a 400% difference in block groups covered.

This major difference is interesting. As such, we explored these carriers further. For Cable One, the NTIA data says they are doing business in only 2 counties (Gila and Pinal). However, when we look at Scout, we see another handful of counties where Cable One is doing business such as Yavapi, Navajo and Graham. In going to the Cable One website, they indicate that they do provide service in all three of these counties.

Likewise, when looking at NPG Cable, they only report having coverage in 4 counties. However, in Scout, we see that they also provide service to La Paz and Mohave counties.

Availability Maps – NTIA

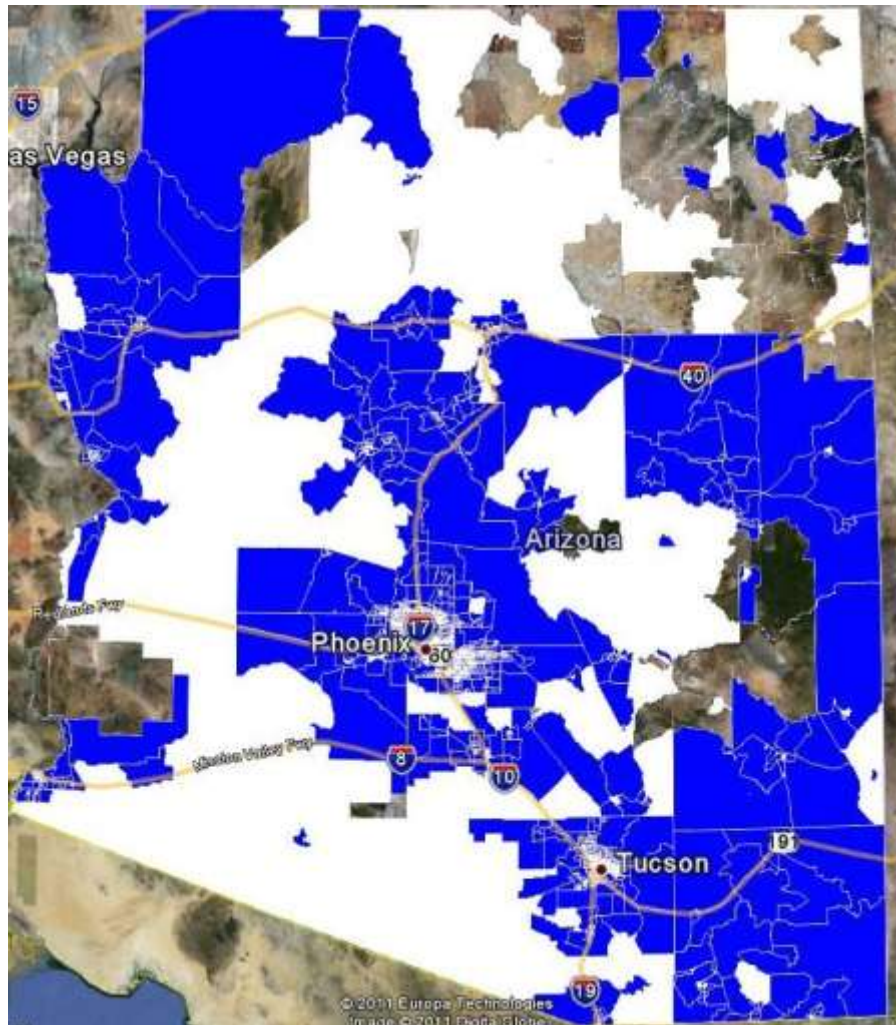
When we look at broadband availability at the Census Block Group Level, we see a fairly complete map when we look at carrier contributed data.



- The blue areas represent block groups where broadband coverage is reported. The white areas represent block groups where coverage is not being reported.
- The map suggests that there is near universal broadband coverage in the state.
- Exceptions are some larger block groups in rural areas as well as some of the reservations.
- Phoenix and Tucson appear to have some “white”, but they are reported to have 100% coverage (the boundary lines are white – thus the illusion).

Availability Maps – Scout

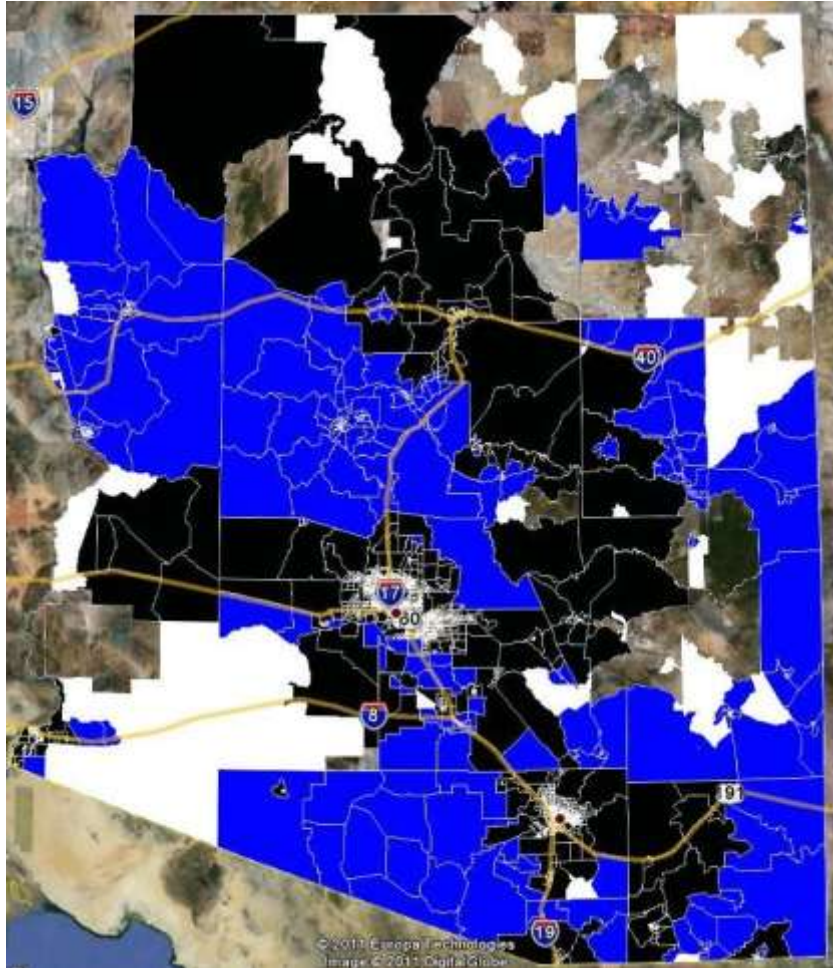
Below is the same map as above, but based on Scout contributed data.



- Like above, blue represents broadband coverage and white represents areas uncovered.
- The Scout map shows many more areas in white which is consistent with our earlier analysis of block groups.
- These areas in white tend to be much more rural in nature.
- As we saw with the carrier contributed map, Phoenix and Tucson show universal coverage.

Speed Map – NTIA

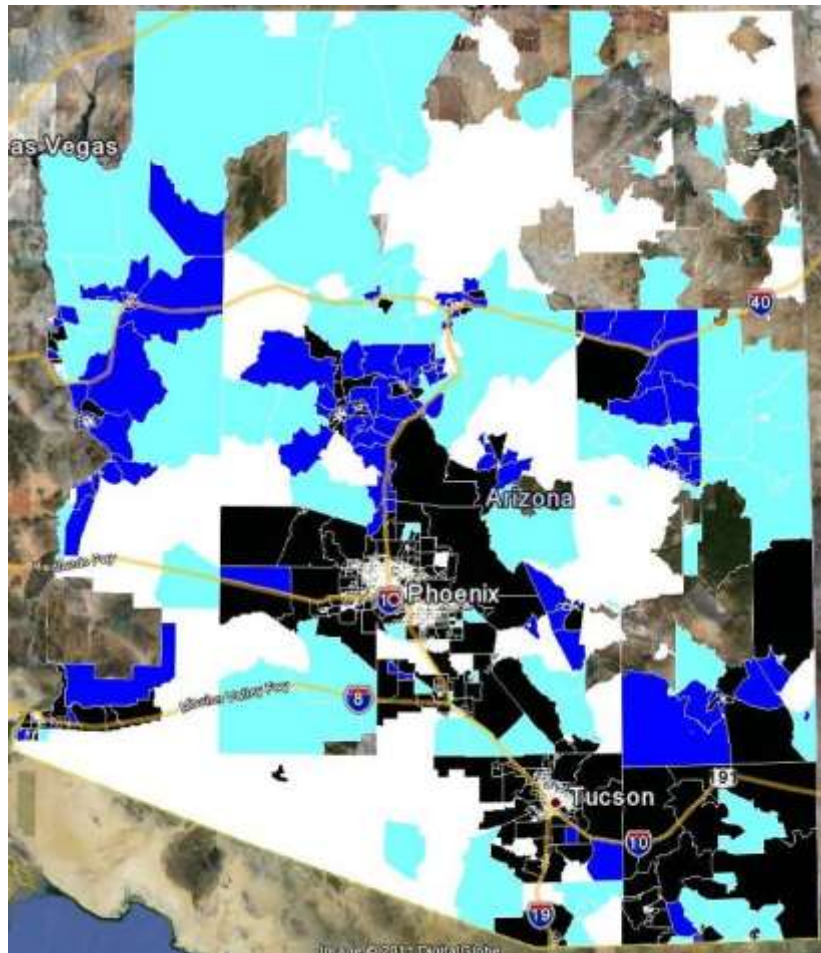
Here we turn our attention to speed. For the purposes of this mapping exercise, we looked at the combined 'typical' upload and download speeds that were reported to the state. The first thing we notice is that every contributing carrier reported at least 5 megabits per second (mbps) of combined download and upload speed. The white areas are again areas with no reported coverage. The blue areas represent block groups where carriers report a combined speed between 5 and 10 mbps. The black areas represent areas reporting over 10 mbps.



- The more urban areas (Phoenix, Tucson) universally report that typical combined speeds of greater than 10 mbps.
- The rural areas tend to be more in the blue range reporting combined speeds between 5 and 10 mbps.
- It is interesting to note that for the most part the speeds being reported are contiguous in nature. For example, in the south central region, we see black around Tucson and then almost all blue as we move south and west.

Speed Map – Scout

Here we look at actual speeds as measured by Scout. It is important to note that when we look at speed on this map, we are looking at 'actual' speed measurements for these IP addresses in Scout. Whereas, the carrier reported speeds are 'typical' (or advertised) speeds, Scout is using the results of actual speed tests of the IP addresses. This is not to say that speed test measurements are the best or most accurate measurement. These measurements can, and are impacted by things such as the processor, the router, time of day, etc. Here the white areas represent no coverage (or speed data), the light blue areas represent speeds below 5 mbps, the dark blue measures between 5 and 10 mbps and the black represents above 10 mbps.



- Clearly, there is an overall shift downwards regarding speed.
- The urban centers agree for the most part regarding the availability of combined speed above 10 mbps (Phoenix, Tucson).
- There is a big swing when considering the light and dark blue areas. Scout sees many more areas of light blue (less than 5 mbps) than were reported from carriers.
- Clearly, setting the bar at 5 mbps of speed can have an impact. Especially, since Scout will typically always see lower speeds given how it is derived.

Conclusions

Unmistakably having more data regarding broadband availability and speeds is extremely important. The creation of the first carrier contributed map will allow us to move the nation's broadband planning forward in a meaningful way. As we also see from the analysis, it is important to be able to effectively verify that the information is accurate. Whether considering the carrier contributed data or Scout, both are measures of the truth. There will inevitably be situations where carriers will (and can) report a presence where there is none. Also, there will be carriers that will not report which creates holes in the map, especially in rural areas where most of the non-participants operate.

We believe this analysis also demonstrates the vital need for ongoing verification of the carrier contributed data. As we begin making public statements such as "our state has 99% broadband availability" and other statements that will impact policy and funds, we should do everything we can to make sure those facts and statements are accurate.

About ID Insight

ID Insight, the innovator in Access-Point Intelligence, knows more about people and their access points -- physical addresses, IP addresses, phone numbers and other points where fraud occurs -- than any other identity-fraud risk-assessment company. Based in Arden Hills, Minnesota, the company combines its massive collection of data on people and access points with patent-pending analytics to help companies prevent fraud, reduce costs and capture more business. ID Insight provides next-generation market research, verification, authentication, and fraud solutions to government agencies, broadband providers, financial services companies, credit issuers, retailers and online merchants nationwide.

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