

Location-Specific Data: The Broadband Serviceable Location Fabric Overview

October 2019





Overview: The BSLF aggregates hundreds of millions of data points, applies statistical scoring, and managed crowdsourcing to pinpoint the exact rooftop locations of virtually every structure that is a candidate for broadband. The BSLF provides a foundation for precise location and service availability.





Pilot (MO and VA): The Pilot project, managed by CQA, is a collaboration between USTelecom, ITTA, WISPA, AT&T, CenturyLink, Chariton Valley, Consolidated, Frontier, Riverstreet, TDS, Verizon, and Windstream.





Pilot (MO and VA): The Pilot shows as many as 38% of additional rural locations are unserved in census blocks that would have been reported as "served" in today's FCC Form 477 reporting approach. These locations are homes and businesses hidden from service providers and policymakers.



Where the Fabric Makes a Difference: Service Locations



Dots shown represent the results of entering the same service addresses into two geocoders. It is unclear how many locations exist in this area or where service would be installed.



The Fabric uses multiple data sources to better identify the locations (green triangles) of homes and businesses that would need service.



Where the Fabric Makes a Difference: Counting Locations



- The number of locations identified for the same census block can vary substantially depending on the data source.
- In this example, there is a 55% differential in location counts:
- 2011 Census Housing Units = 47
- Fabric Locations = 21
- Are all the locations served?



Where the Fabric Makes a Difference: Counting Locations



The number of locations identified for the same census block can vary substantially depending on the data source and data vintage.

In this example, there is a 32% differential in location counts:

- 2011 Census Housing Units = 260
- Fabric Locations = 380

The Fabric identified 120 additional locations beyond build out requirements



Where the Fabric Makes a Difference: Accurate Geocoding



Geocoded vs. Fabric Locations

Geocoding in rural areas often identifies a latitude/longitude at or near the roadside. The Fabric generates a latitude/longitude specific to the rooftop of each structure.

In this example, the difference for just eight locations submitted to the HUBB was over 521 meters (1709 feet).

Structure-accurate coordinates can support location reporting and network planning



How the Fabric is Created

- Goal: Identify the structure(s) needing service
- Challenges:
 - Secondary structures (barns, garages, etc.)
 - Addresses aren't automatically geo-referenced
 - Defining what structures are "serviceable" or funded needs to be clearly defined by policymakers





How the Fabric is Created

Step 1:

- Overlay parcel data
- Use Tax Assessor and parcel attribute data to categorize parcels
 - Are there multiple locations?
 - Does the land use indicate there may be a serviceable structure?
 - Consider improvement value, information on secondary structures, etc.





How the Fabric is Created

Step 2:

- Incorporate building footprint data
 - Footprints identify candidate locations for the Fabric
 - Footprints improve the interpolation of textual address data with real-world accuracy of where serviceable structures are





Step 3:

- Using parcel attribute data and building footprints, logic is applied parcel by parcel to interrogate and aggregate data
- The Fabric identifies serviceable structure(s), circled, on each parcel





The Fabric Compared to Geocoders

Shown: Results of the Fabric compared to two geocoders

- Geocoder A (pink dots) missed two locations and added two extra
- Geocoder B (orange dots) missed four locations
- Poor and inconsistent geocoding hampers deployment, customer service, and compliance reporting





Key Pilot Findings - Rural Missouri & Virginia



Missouri Location Distance Differential: Geocoded¹ vs. Fabric



Distance Differential – Geocoded locations vs. Fabric locations

<u>Key Findings</u>

- 84% of geocoded locations > 7.6m from Fabric locations
- 55% of geocoded locations > 50m from Fabric locations

Average distance between geocoded & Fabric is ~130m

<u>Context</u>

7.6 meters is the HUBB accepted margin of error to determine if a filed location is in an eligible area. A difference of more than 50 meters could represent a different location, a different eligible census block, or skew build costs and network designs.

¹ These locations, many of which were geocoded by a geocoding tool, were sourced from HUBB data as a point of comparison for this study.



Locations with 1,000m+ differential excluded as outliers

The Reveal

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~10 Census Blocks in MO that would be identified as SERVED in today's 477

"One-served, All-served"

Blue shaded area represents the coverage of the 10 Census Blocks





Potential DODC Polygon Coverage approach for these 10 census blocks

Polygons based on:

- Served carrier <u>geocoded</u> addresses
- 150ft buffers on roads touched by geocoded points





Polygons are created using address <u>geocoding</u> in these 10 census blocks

Green dots represent Fabric locations associated with addresses used to create polygons

It is clear the polygons based on poor geocoded information will misinform





The BIG COVERAGE REVEAL

The Fabric combined with carrier information allows us to now see extent of the of Served (green dots)and more importantly the Unserved(red dots) locations in this 10 Census Block area





Polygons



Polygons: Geocoded Addresses

The FCC's DODC order will required carriers to file polygons representing served areas However, methods and basis have not been settled

Polygons based on:

- Served carrier <u>geocoded</u> addresses
- 150ft buffers on roads touched by geocoded points





Polygons: Segments Based on Fabric Locations

The FCC's DODC order will required carriers to file polygons representing served areas However, methods and basis have not been settled

Polygons based on:

- Served Fabric locations
- 150ft buffers about road segments touched by a Fabric point





Polygons: "Pearls" Based on Fabric Locations

The FCC's DODC order will required carriers to file polygons representing served areas However, methods and basis have not been settled

Polygons Based on:

- Served Fabric locations
- 150ft buffers about the latitude and longitude of the Fabric point





Polygons: Segments Based on Fabric Locations

The FCC's DODC order will required carriers to file polygons representing served areas However, methods and basis have not been settled

Polygons Based on:

- Served Fabric locations
- 500ft buffers about road segments touched by a Fabric point





Polygons: Blocks Based on Fabric Locations

The FCC's DODC order will required carriers to file polygons representing served areas However, methods and basis have not been settled

Polygons Based on:

- Served Fabric locations
- Census Blocks with more than 80% of Fabric points served





Address Search

With the Fabric[⊥] and Fabric based coverage polygons, the consumer will now have a clear view of broadband availability





Deployment Costs



Cost of Deployment - Sample

Please choose the state you would like to see demographic and investment information for below: State of Interest: PA \checkmark

Congressional District:

4218

PA Demographics and Investment Cost: U.S. Congressional District 18

| ent for | Speed Category | Density | CBs w/ HU | Total Investment | Residential Population | Residential Housing Units | Residential MDU | Business Locations* | 40.400 |
|------------|----------------|---------|-----------|------------------|---------------------------|------------------------------|--------------------|------------------------|---------------------------|
| st: | Served | R | 341 | (| 18,513 | 5,981 | 94 | 483 | 18,689 |
| | Served | S | 11,550 | 0 | 524,037 | 251,869 | 9,685 | 23,781 | Total Census Blocks |
| \sim | Served | U | 3,324 | 0 | 146,672 | 87,036 | 5,797 | 12,635 | |
| | Underserved | S | 4 | 27,012 | . 0 | 0 | 0 | 25 | |
| | Underserved | U | 10 | 214,992 | 108 | 36 | 5 | 187 | 2 0 0 5 |
| | Unserved | R | 430 | 232,496 | 5 210 | 83 | 2 | 43 | |
| District: | Unserved | S | 2,682 | 5,039,207 | 3,040 | 3,040 1,822 30 | 1,448 | 3,775 | |
| \sim | Unserved | U | 348 | 1,774,264 | 1,887 | 535 | 19 | 1,075 | CBs with No Housing Units |
| | Total | | 18,689 | 7,287,972 | 694,467 | 347,362 | 15,632 | 39,677 | |





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