

The Efficacy of the Connect America Fund in Addressing US Internet Access Inequities

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Berkeley
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Does the “Net” Work for All?

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- **Prevalence of Internet Access Inequity**
 - 10% of population cannot **afford** Internet due to high subscription cost¹
 - 30M lack access to **performant** (high-speed) Internet; 40% in rural/tribal areas²

1. *How Can the United States Address Broadband Affordability? Pew Charitable Trust Report*, <http://tinyurl.com/ybyv9beh>
2. *FCC’s National Broadband Map*, <https://broadbandmap.fcc.gov>

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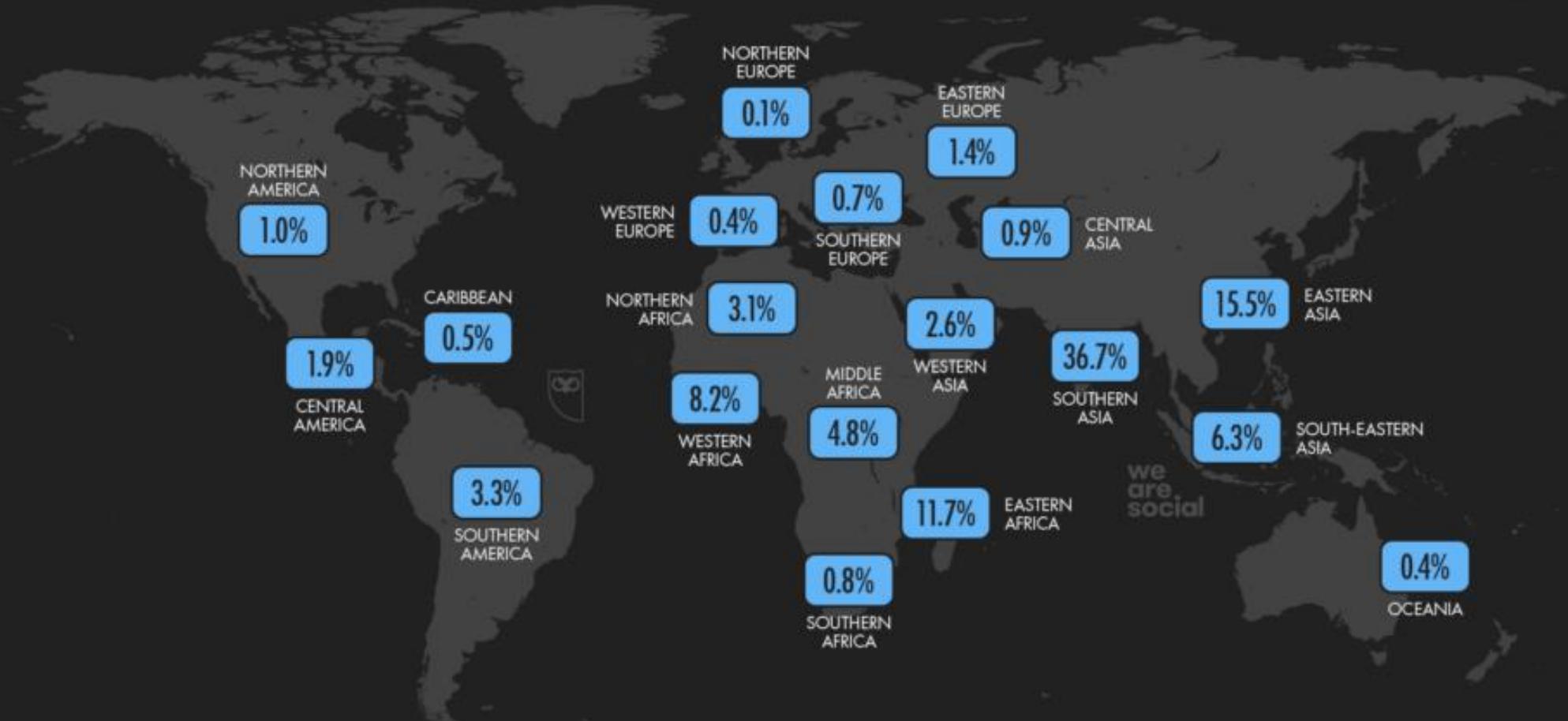
Marginalizes underprivileged groups in the digital society

1. *How Can the United States Address Broadband Affordability? Pew Charitable Trust Report*, <http://tinyurl.com/ybyv9beh>
2. *FCC's National Broadband Map*, <https://broadbandmap.fcc.gov>

APR
2022

SHARE OF THE WORLD'S OFFLINE POPULATION

PERCENTAGE SHARE OF THE WORLD'S TOTAL OFFLINE POPULATION



23

SOURCES: KEROS ANALYSIS, ITU, GSMA INTELLIGENCE, EUROSTAT, GWI, CIA WORLD FACTBOOK, CNNIC, APJI, LOCAL GOVERNMENT AUTHORITIES, UNITED NATIONS. NOTE: REGIONS BASED ON THE UNITED NATIONS GEOSCHEME. COMPARABILITY: SOURCE AND BASE CHANGES.

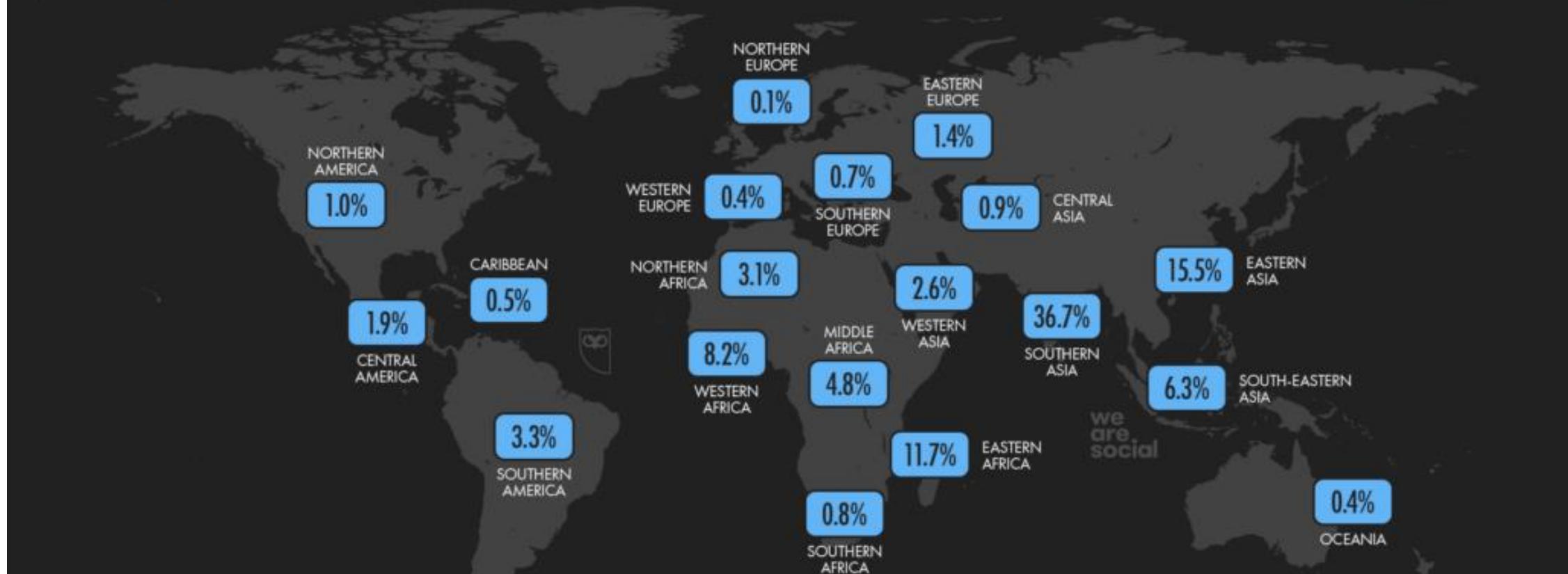
we
are.
social  Hootsuite

1. International Telecommunication Union (ITU), <https://www.itu.int/en/mediacentre/Pages/PR-2024-11-27-facts-and-figures.aspx>

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2.6 billion lack Internet Access ! (32% of the world pop.) ¹

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How Policymakers Influence Internet Access?

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Multi-billion dollar policy interventions

Program	Funding	Description
Broadband Equity, Access and Deployment (BEAD) Program (2022-Present)	\$44 Billion	Fund new infrastructure deployments to ensure high-speed Internet for all
Connect America Fund (CAF) (2011-2021)	\$10 Billion	Subsidize new infrastructure in hard-to-serve areas
Affordability Connectivity Program (ACP) (2021-2024)	\$14 Billion	Subsidize high-speed Internet for low-income households
...

Fundamental Problem

Internet Service Providers



Policymakers



Internet Availability, Quality, and Cost

**Unreliable
Noisy**

Fundamental Problem

BLOCKING COMPETITION —

ISP admits lying to FCC about size of network to block funding to rivals

ISP gave FCC false coverage information to prevent others from getting grants.

JON BRODKIN - 2/2/2023, 12:06 PM



**Unreliable
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↓ Cost



Policymakers

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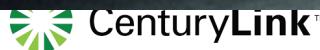
DECEMBER 10, 2020

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Fundamental Problem

DECEMBER 10, 2020

CAPITO CAUTIONS FCC ON RDOF FUNDING FOR FRONTIER

BLOCKING COMPETITION —

ISP admits lying to FCC

to
ISP ga

JON BRO

TECHNOLOGY

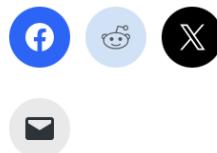
Colorado is challenging 13,000 speed inaccuracies in the new federal broadband map

More challenges are likely and if your broadband is subpar, the state's Broadband Office wants to hear from you



Tamara Chuang

4:12 AM MST on Dec 6, 2022 Updated 1:21 PM MST on Dec 7, 2022



I Cost



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Presley issues investigative subpoena to AT&T



Tamara Chuang

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For the Monroe Journal Sep 10, 2020

Cost



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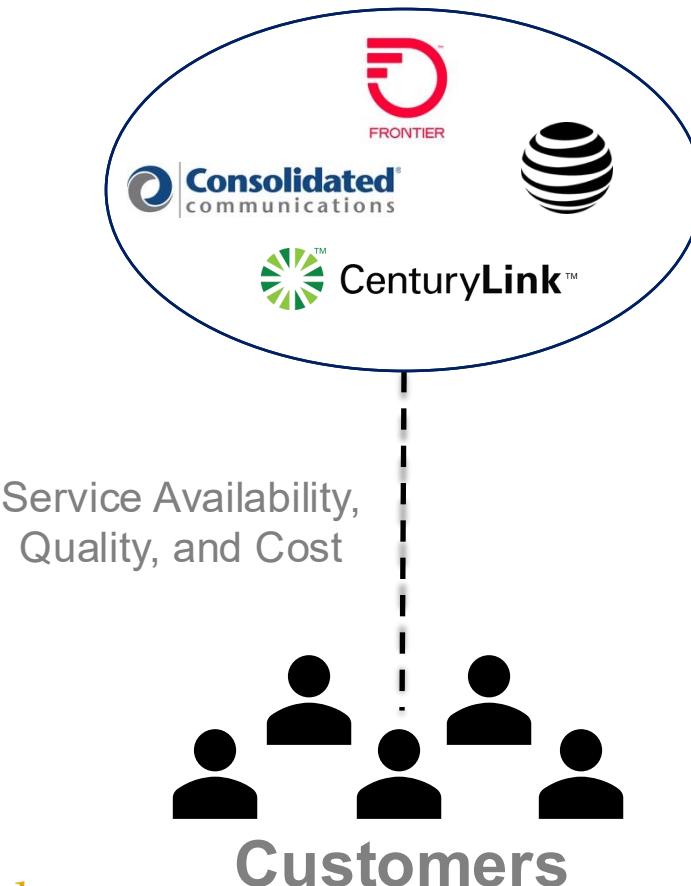


How to reduce reliance on **self-reported** data from ISPs?

4:12 AM MST on Dec 6, 2022 Updated 1:21 PM MST on Dec 6, 2022

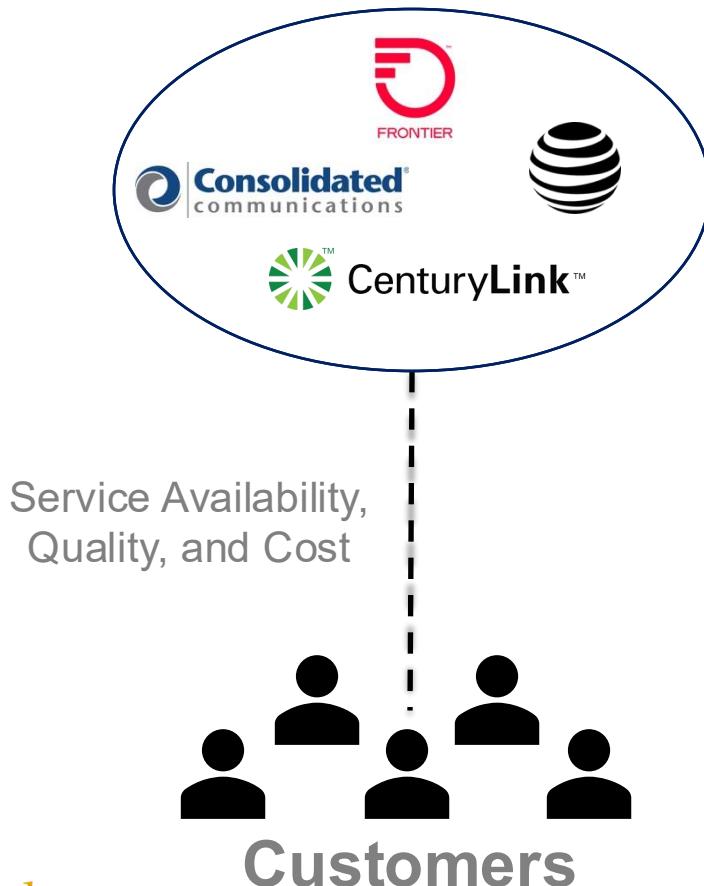
How can we address this ?

Leverage our prior work: **Broadband-plan Querying Tool (BQT) [SIGCOMM '23]**



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Leverage our prior work: **Broadband-plan Querying Tool (BQT) [SIGCOMM '23]**



The screenshot shows a web-based tool for querying broadband plans. At the top, there is a search bar with the address "5663 Cielo Ave, #B, 93117" and a red oval highlighting the address field. Below the address bar is a green banner with the text "Unlock extra savings on select Cox Internet plans and experience unbeatable 5G reliability on-the-go when you add Cox Mobile after purchase." and a "Find out how" button. The main content area has a heading "GET HIGH-SPEED INTERNET AT AN AFFORDABLE PRICE FROM A LEADING INTERNET PROVIDER" followed by a descriptive paragraph. The "Quality" section features a red oval highlighting "100 Mbps" and "Max download speed". The "Availability" section shows the address again. The "Cost" section highlights two plan options: "\$35.00/mo" and "\$50/mo", both with red ovals. To the right of the plans are buttons for "Order now", "Customize plan", and "Plan details".

What is the Broadband-Plan Querying Tool (BQT)?

Automates querying ISPs' web interfaces at scale to extract advertised (**reliable**) broadband **availability, quality** and **affordability** at street-level granularity (**fine-grained**).



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	pricing	exec_time	service_status
{0: '500 Mbps\n500 Upload / 500 Download\n\$39....		60.02	Serviceable
{0: '25 Mbps\nSpeeds up to 25 Mbps\n\$39.99\n/mo...		70.32	Serviceable
{0: '3 Mbps\nSpeeds up to 3 Mbps\n\$39.99\n/mo...		86.06	Serviceable



Get notified about AT&T Fiber

We're still rolling out our faster internet experience. Get on our list so we can notify you if AT&T Fiber becomes available at your address.

[Notify me](#)

Service address

[REDACTED]

Enjoy AT&T Internet today

AT&T INTERNET

Simple, straightforward pricing

Get internet with no annual contract and no equipment fees.

 The Affordable Connectivity Program (ACP) is a federal government program that provides a benefit on internet service for eligible low-income households. [Learn more or apply your benefit](#)

Internet Basic 768kbps
768Kbps speed

\$70.00/mo.
\$55.00/mo.

for 12 mos. Plus taxes Autopay & paperless bill reqd.

Price excludes taxes and is after \$5/mo. AutoPay and paperless bill discount (w/in 2 bills). Monthly state cost recovery charge applies in TX, OH, and NV. One-time install charge may apply. [See offer details](#)

[Continue \(\\$55/mo.\)](#)

[Feedback](#)

Example of a “serviced” landing Page

The image is a screenshot of the AT&T website. At the top, there is a navigation bar with the AT&T logo, a deals menu, and links for Wireless, Internet, Accessories, Prepaid, and Business. To the right of the navigation is a search bar with the placeholder "I'm looking for..." and a magnifying glass icon. Further right are a shopping cart icon, "Support" link, and "My AT&T" dropdown menu. The main content area has a black header bar with the text "Looks like AT&T Internet isn't available at your address." Below this, a message says "Need help? Call us. 833.403.8784". The main visual is a photograph of a man with headphones working at a desk, a young boy to his left looking at a computer screen, and a baby in a high chair in front of him, all looking at a tablet he is holding. Below the image, a section titled "Your address" has a redacted input field and a "Sign in" link. Another section titled "Other available options" shows a message that AT&T Internet is not available and offers to put the user on a list for AT&T Fiber. To the right of this text is a stylized illustration of a neighborhood with houses and roads.

Deals Wireless Internet Accessories Prepaid Business

I'm looking for...

Support My AT&T

Looks like AT&T Internet isn't available at your address.

Need help? Call us. 833.403.8784

Your address

Already have an AT&T account? Sign in for special offers. [Sign in](#)

Other available options

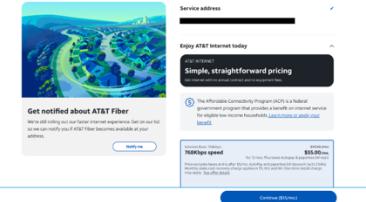
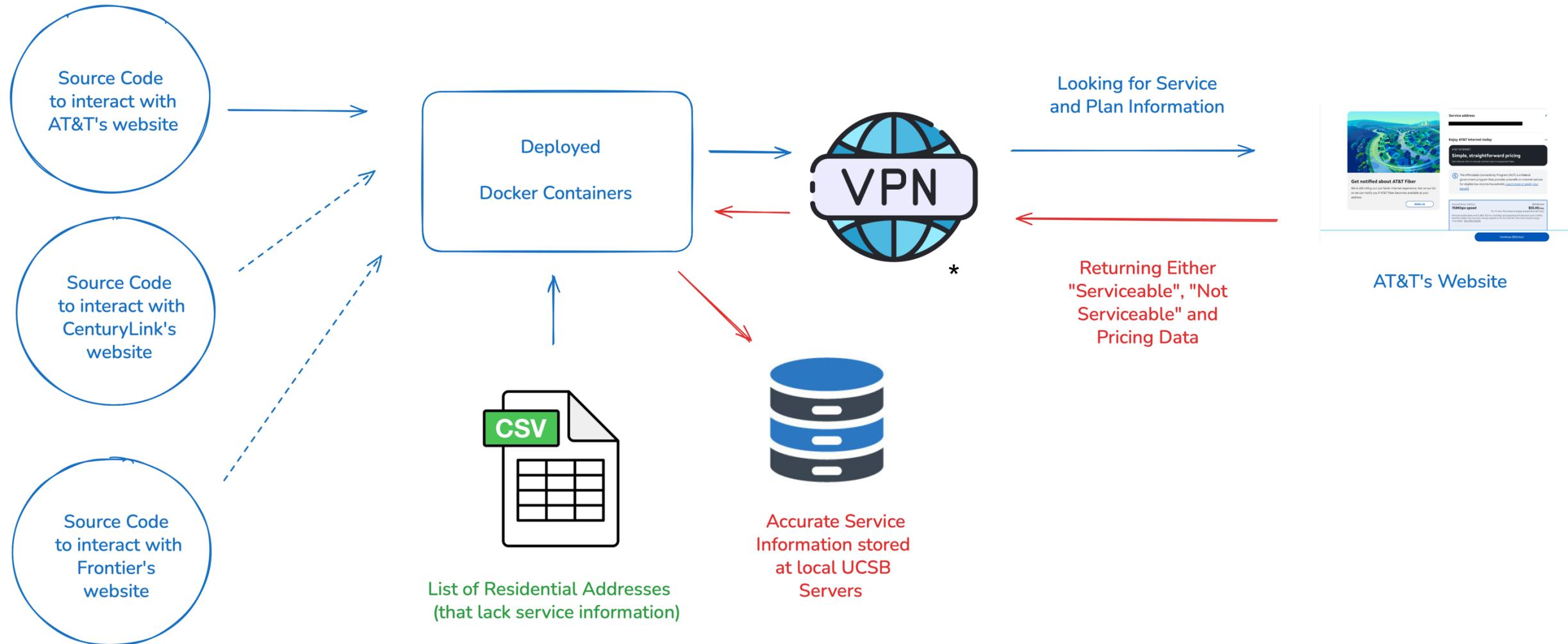
AT&T Internet is not available at your address.

INTERESTED IN AT&T FIBER®?
Want more speed? Get Notified.

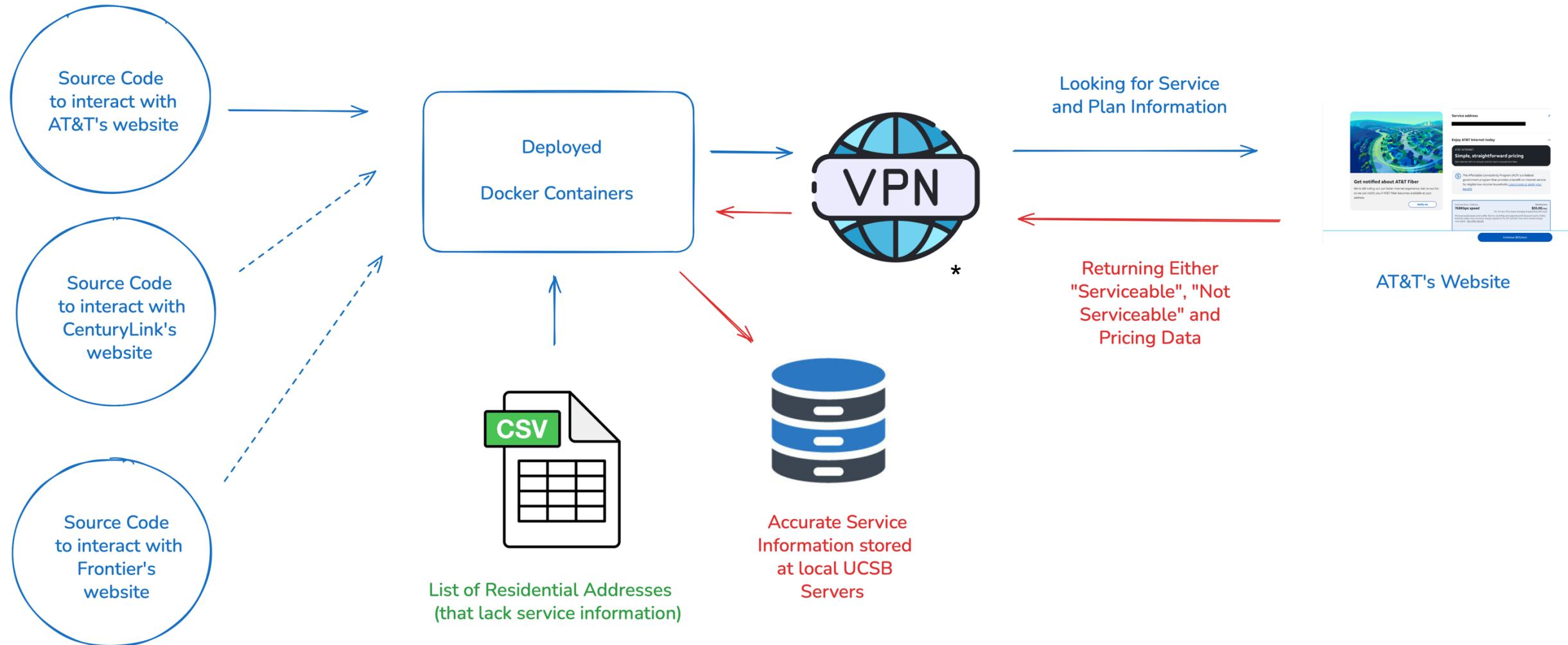
We're continuing to expand our next generation of internet. Get on our list so we can notify you if AT&T Fiber® or other home internet products become available at your address.

[Notify me](#)

Example of a “Not serviced” landing Page



AT&T's Website



How can BQT assess CAF's "true" success?

Connect America Fund (CAF) Program

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- **Goal**
 - To address the disparity in access to affordable and performant Internet services in high-cost regions (rural areas with lower population density)

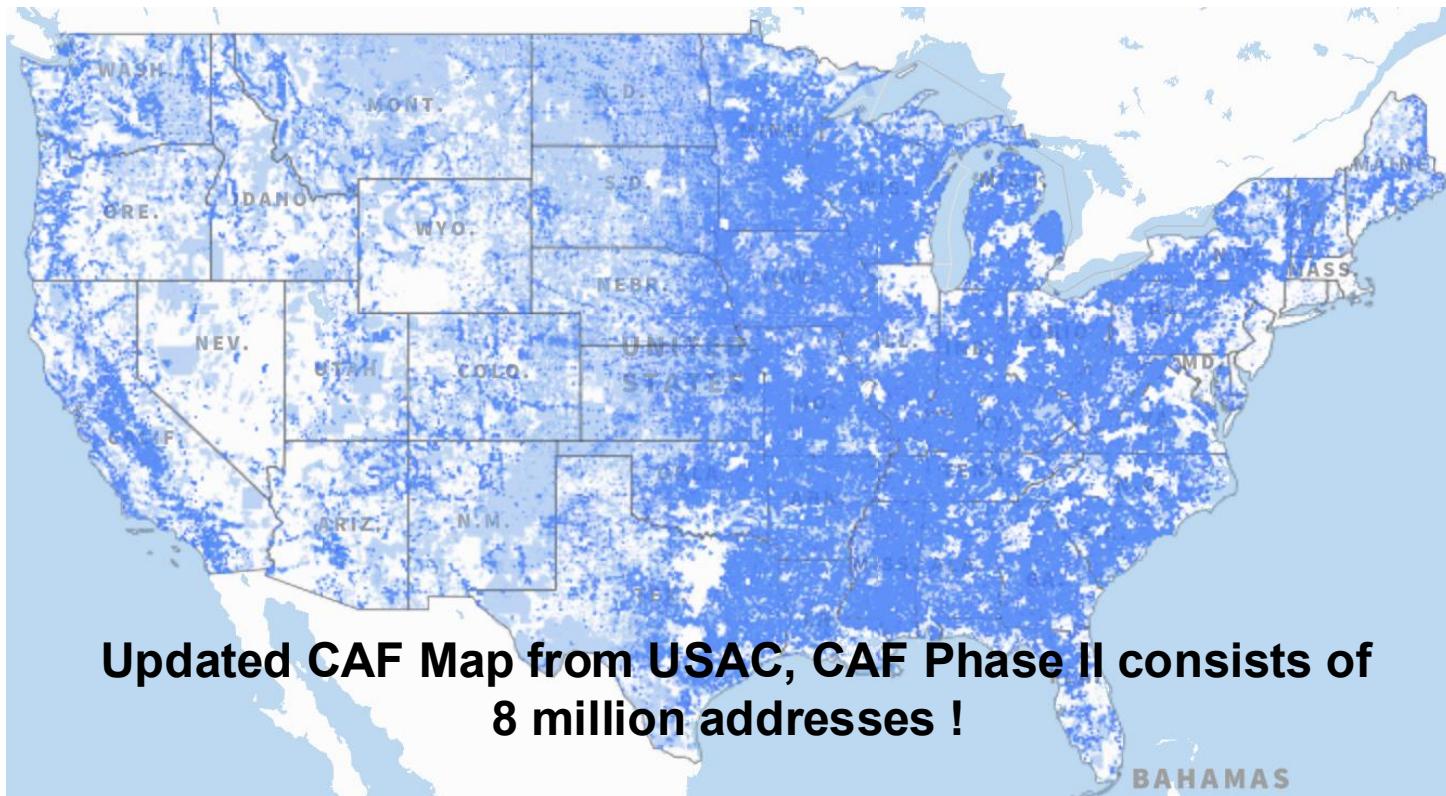
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 - CAF subsidized ISPs in regions that lacked broadband internet access (6+ million addresses)
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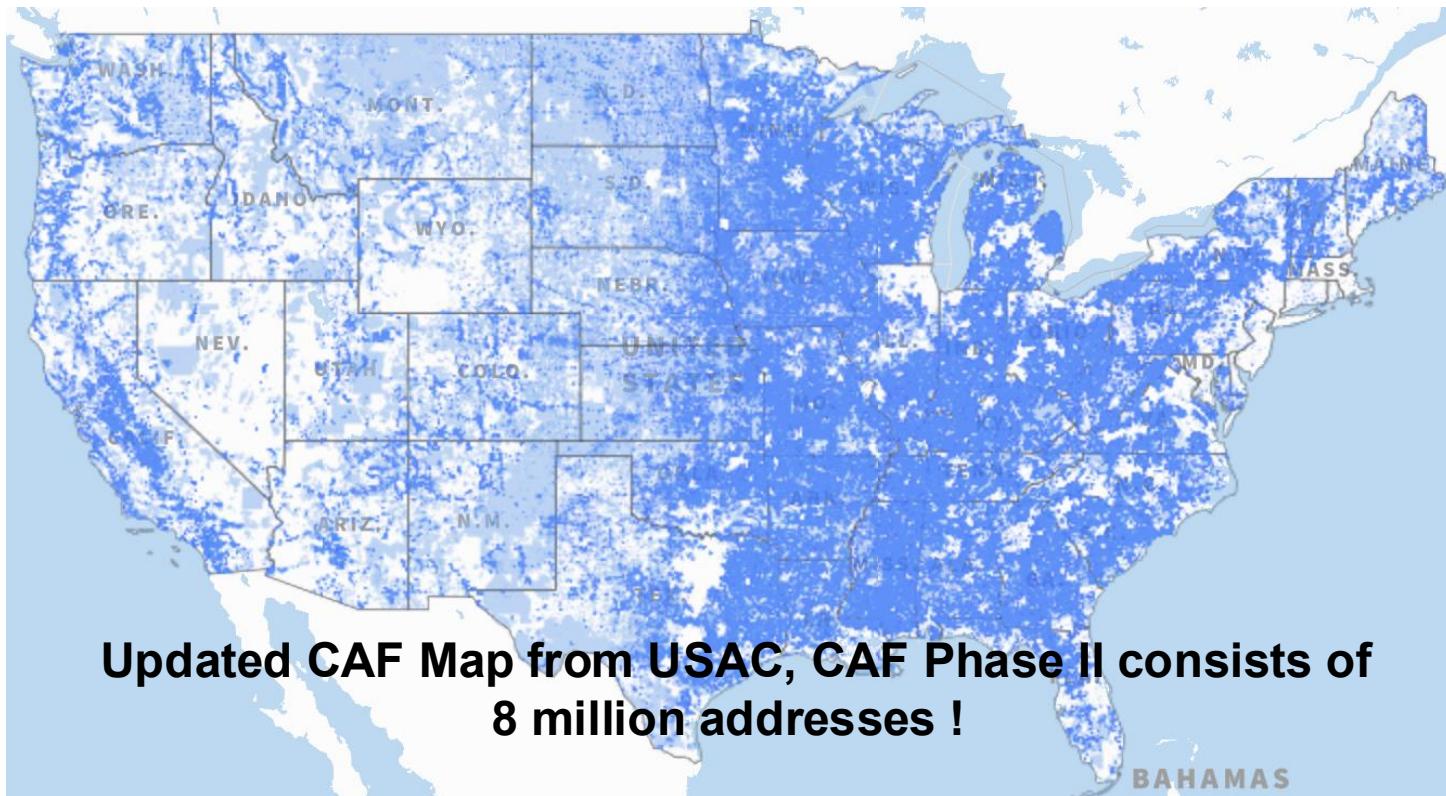
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- **Certification**
 - ISPs certified addresses they served and speeds they offered (**self-reported!**)

Connect America Fund (CAF) Program



Connect America Fund (CAF) Program



How effective was the CAF program in expanding Internet access?

How to Measure Success of CAF ?

Key Policy Questions

- **Question 1:** Are some ISPs **truthful** about the addresses they certify as served?
- **Question 2:** Do some ISPs always **comply** with FCC's service quality and rate requirements?
- **Question 3:** Do regulated monopolies offer **better value** to users than unregulated ones?

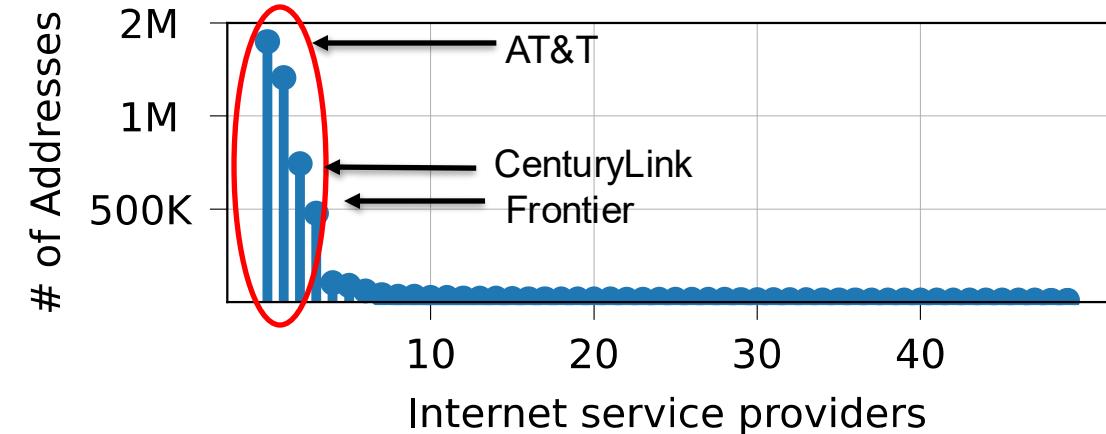
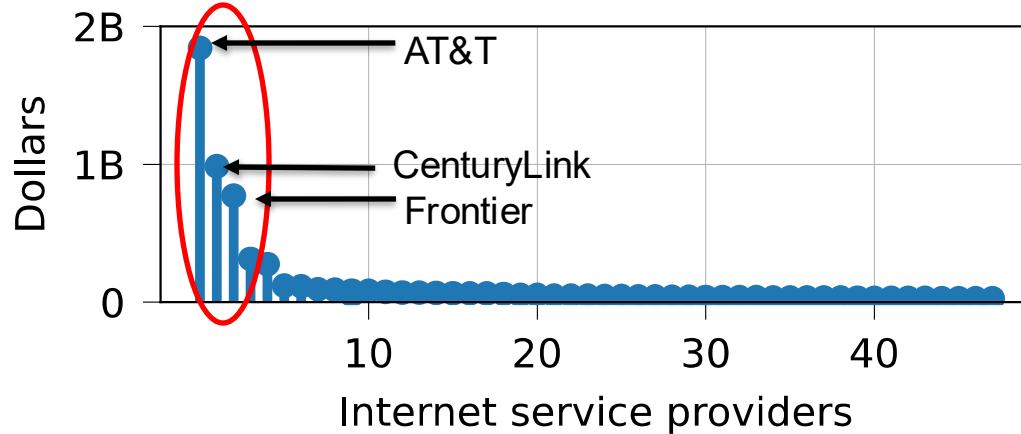
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Which ISPs and addresses to query?

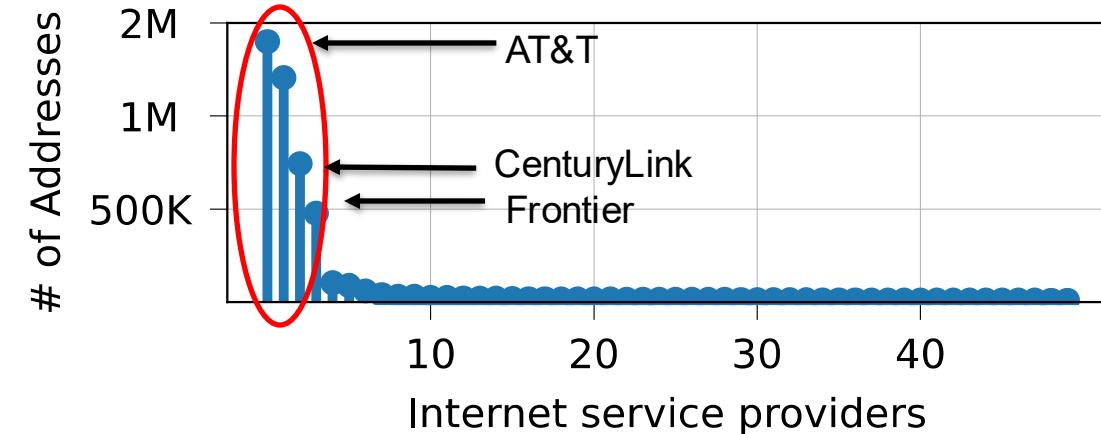
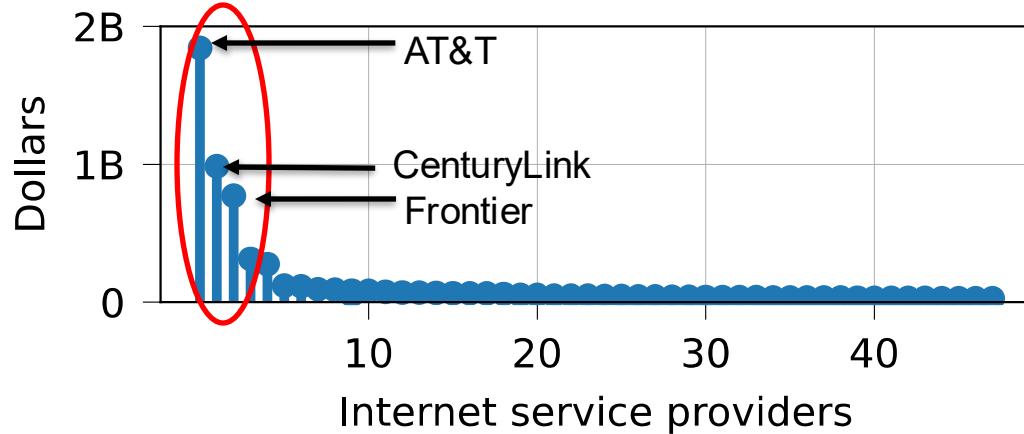
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New CAF Dataset: Certified vs. Advertised Information

Which ISPs and addresses to query?



- Targeted **top-3 ISPs** (AT&T, CenturyLink, Frontier) and a smaller ISP (Consolidated) covering more than 50% of CAF addresses
- Selected **15 states** for geographic diversity where these ISPs are primary providers
- Randomly chose **30+ addresses (at least 10%)** from each census block group

New CAF Dataset curated with BQT

ISPs	CAF Addresses Collected
AT&T	233,247
CenturyLink	111,841
Frontier	169,766
Consolidated	22,806

Broadband plan data for **687k** street addresses:

- **537k** CAF addresses
- **149k** non-CAF addresses

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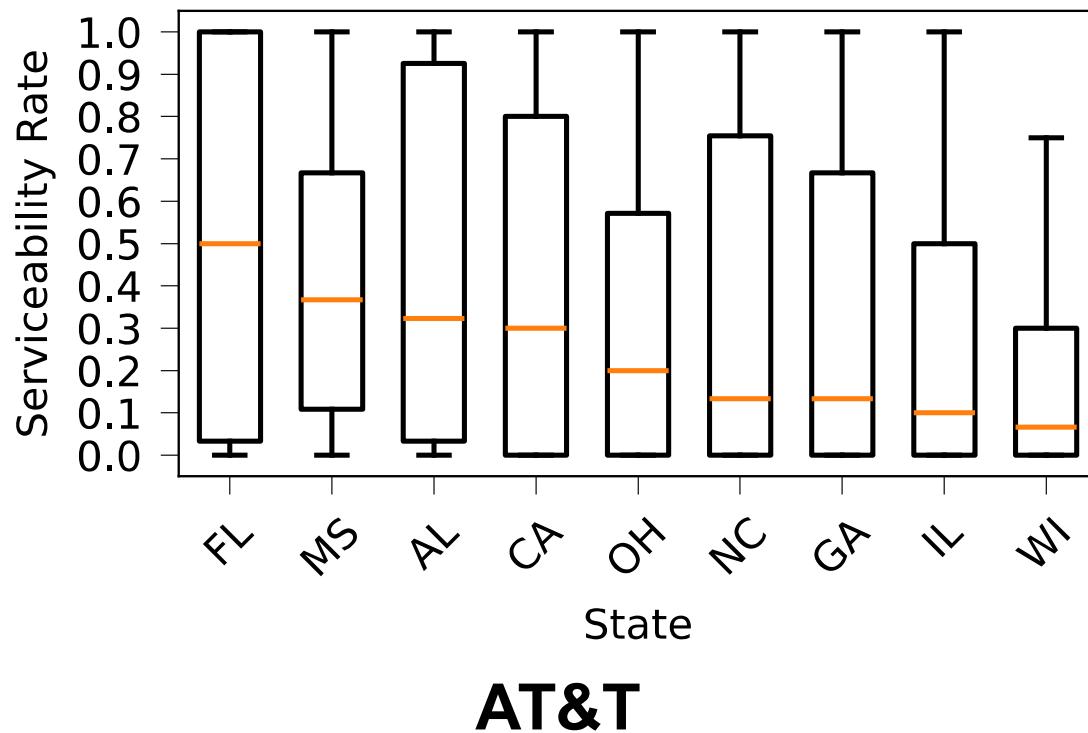
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AT&T received around **\$1 billion** through the CAF program.

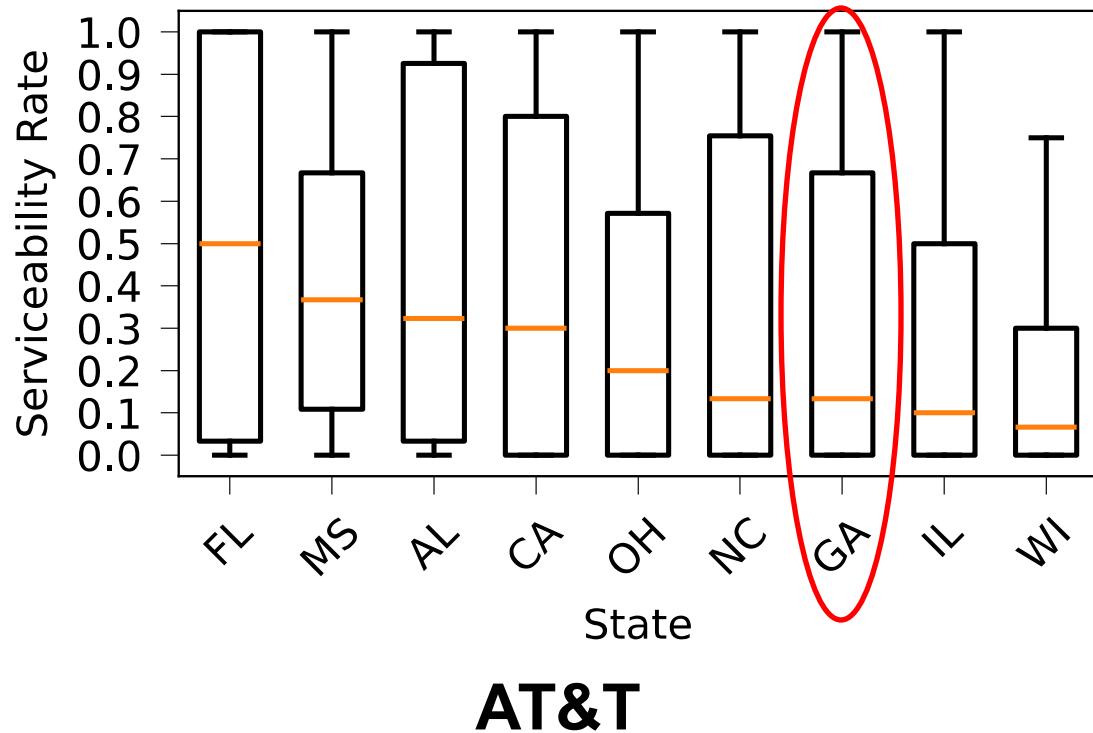
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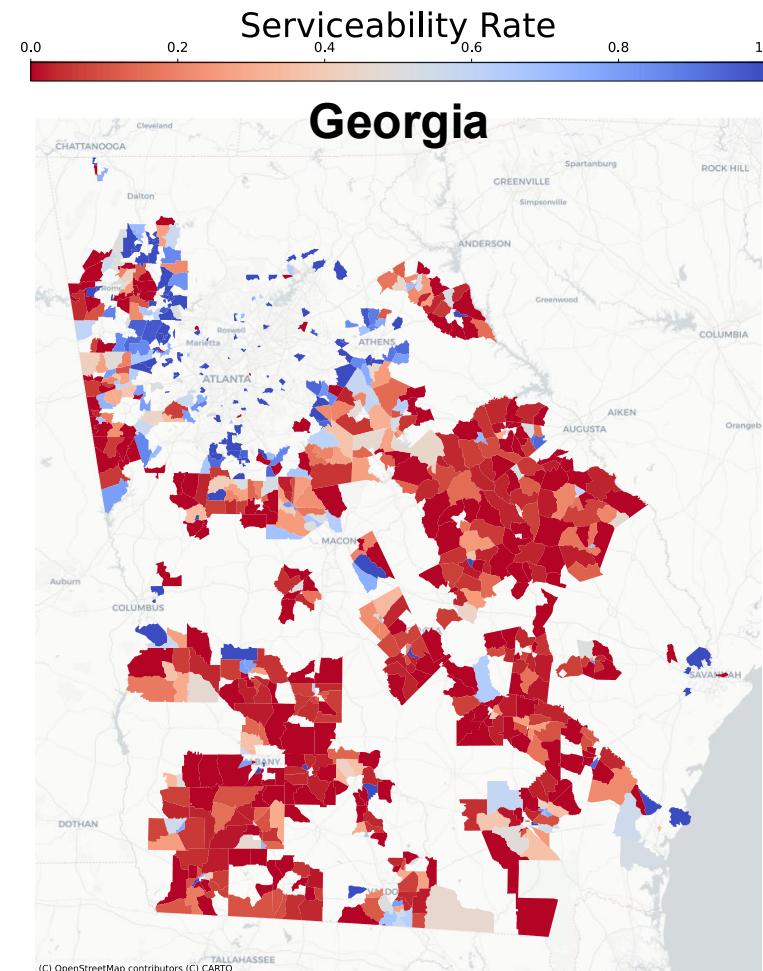
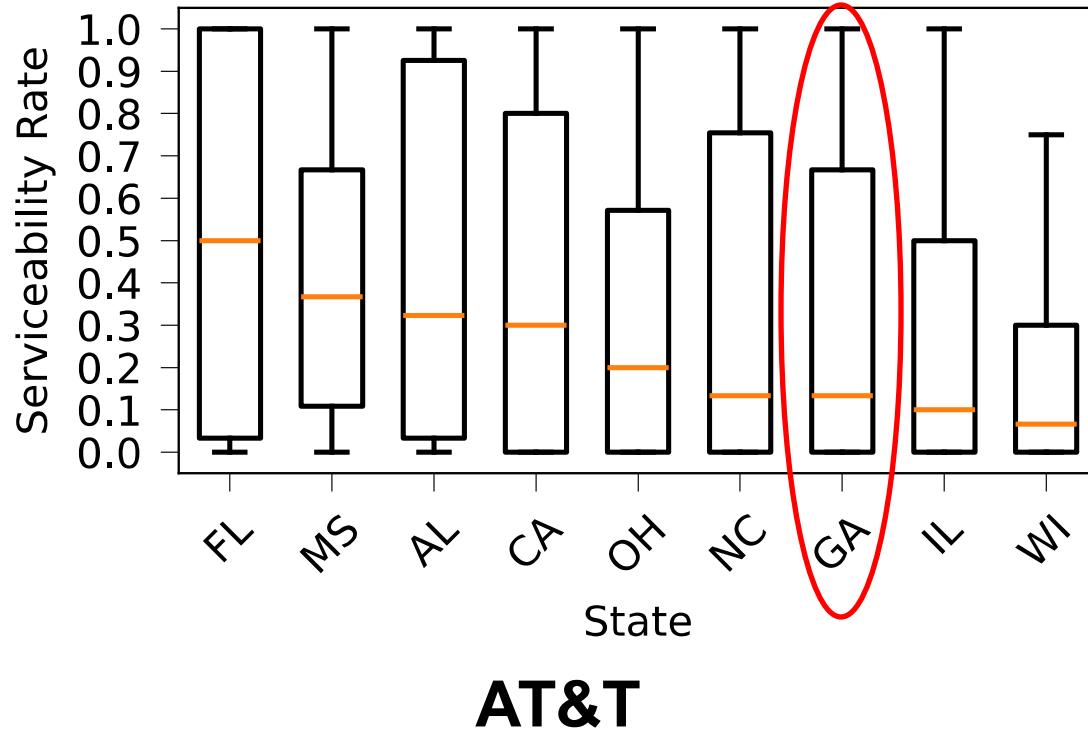
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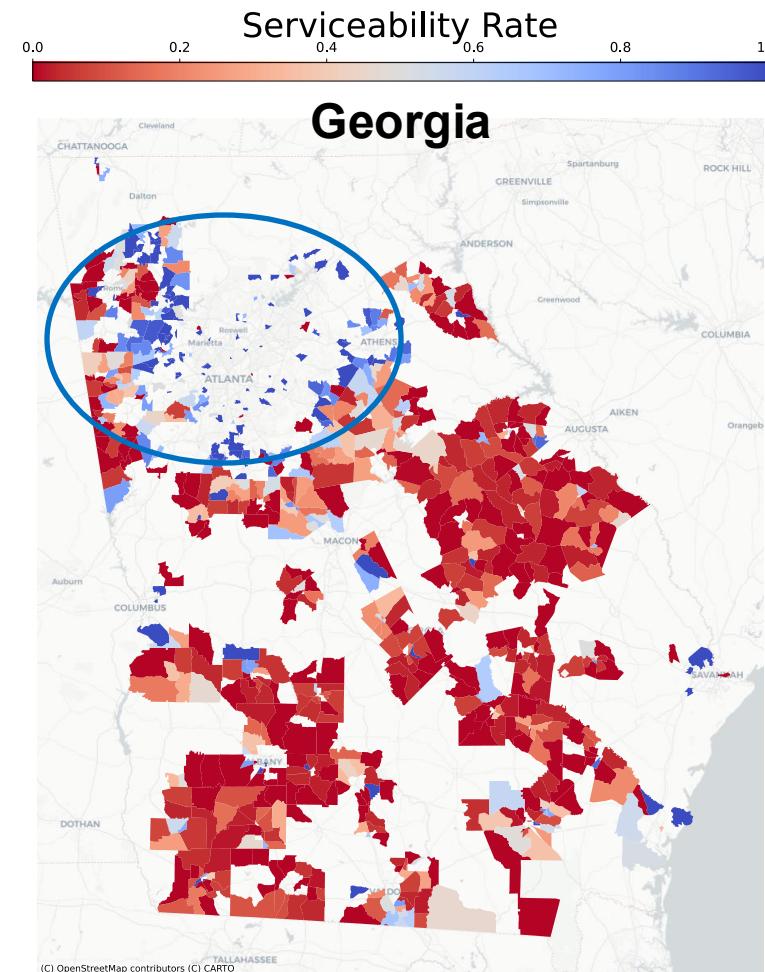
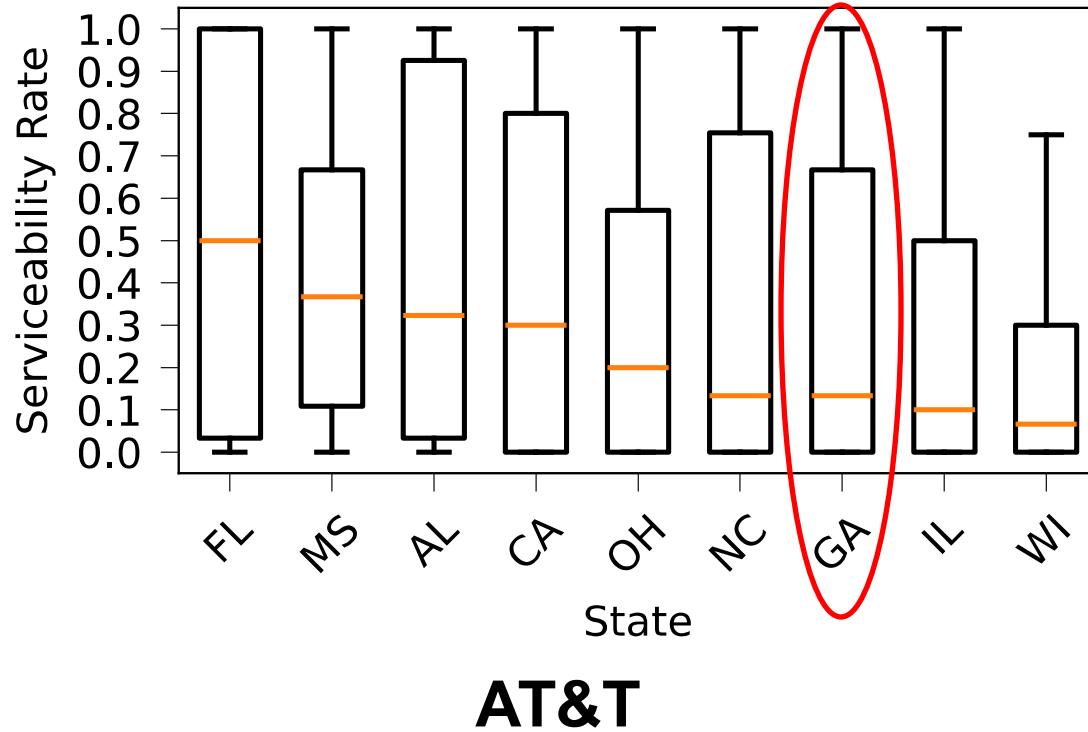
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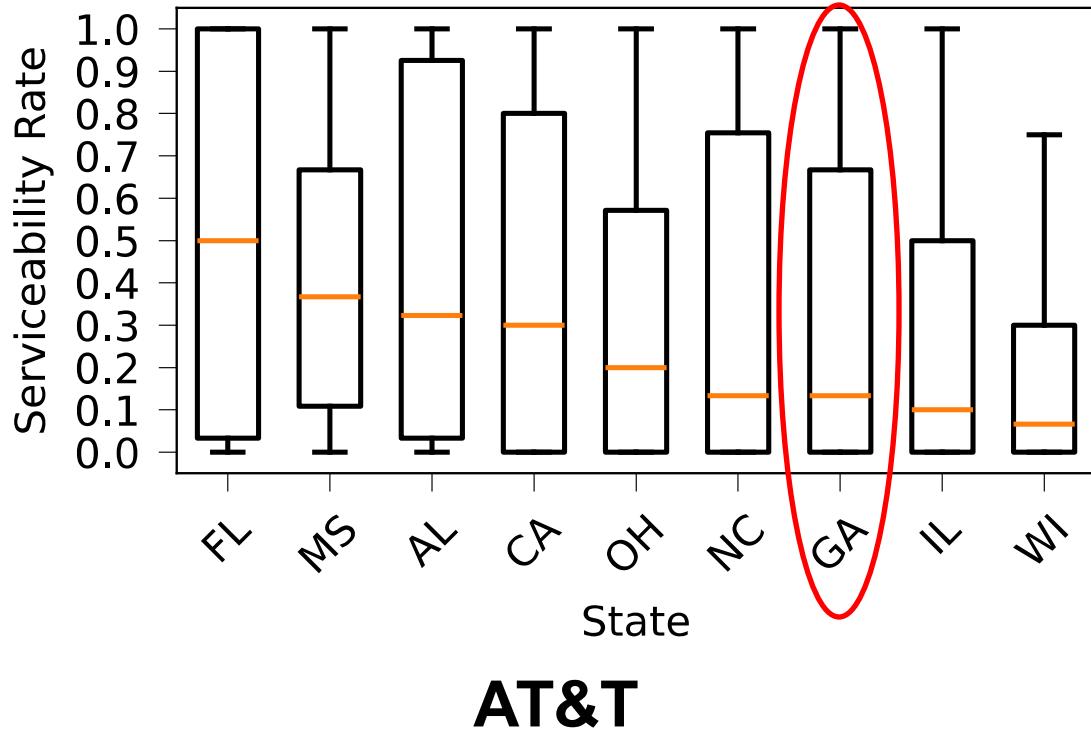
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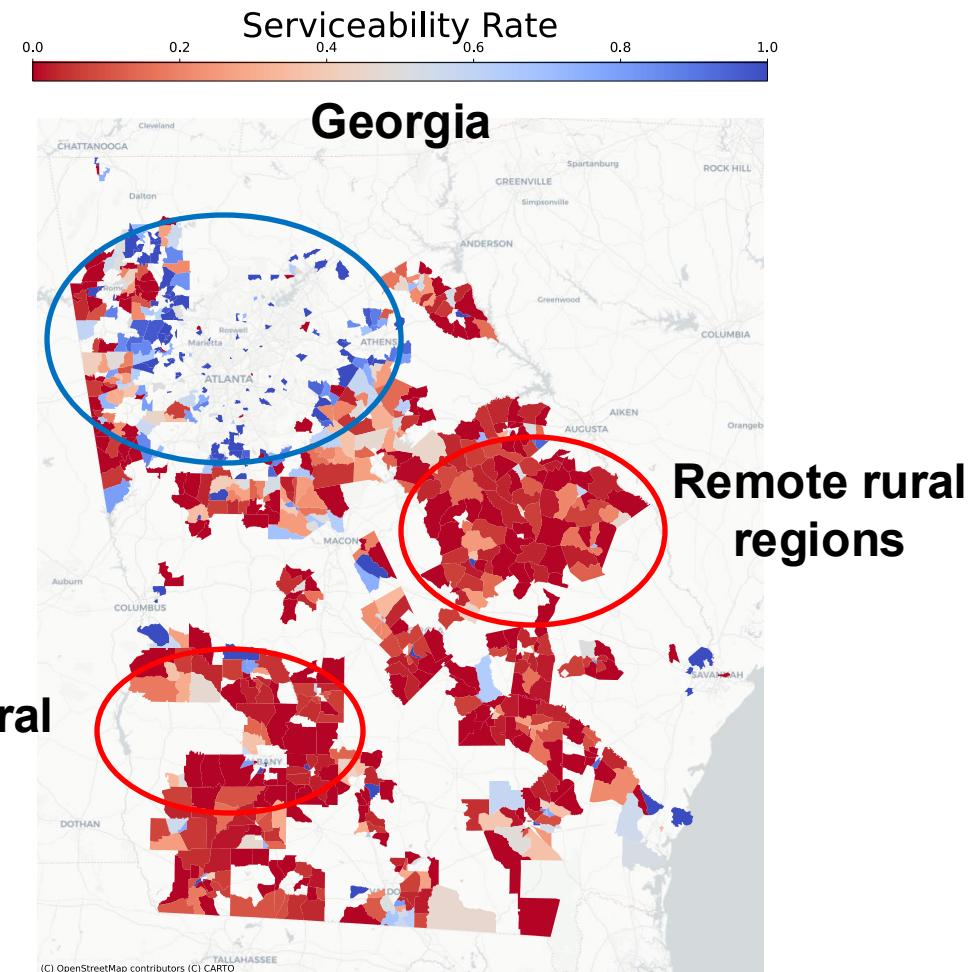


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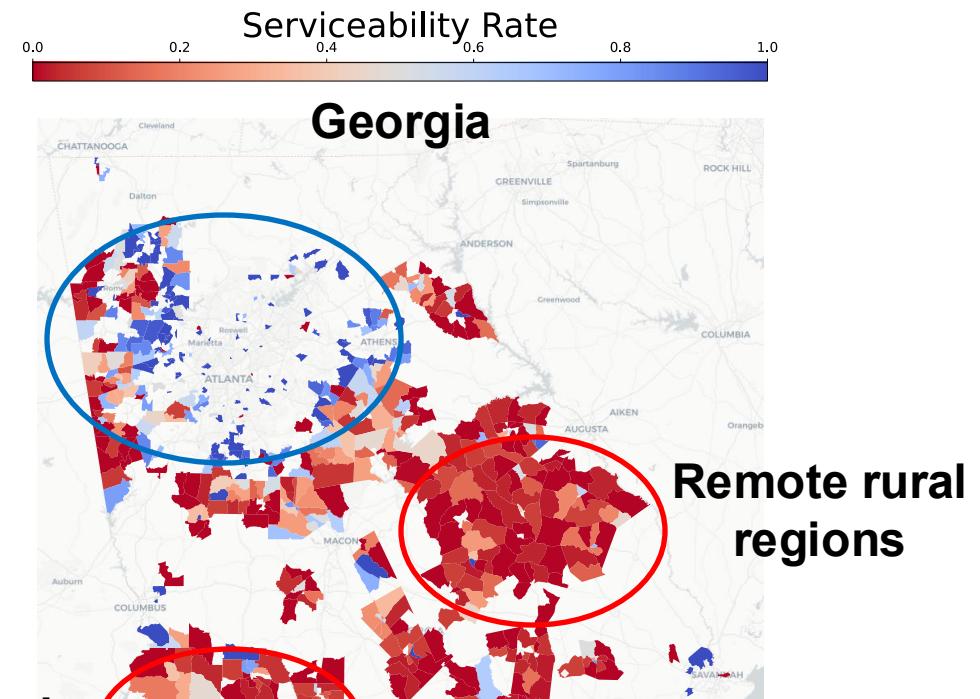
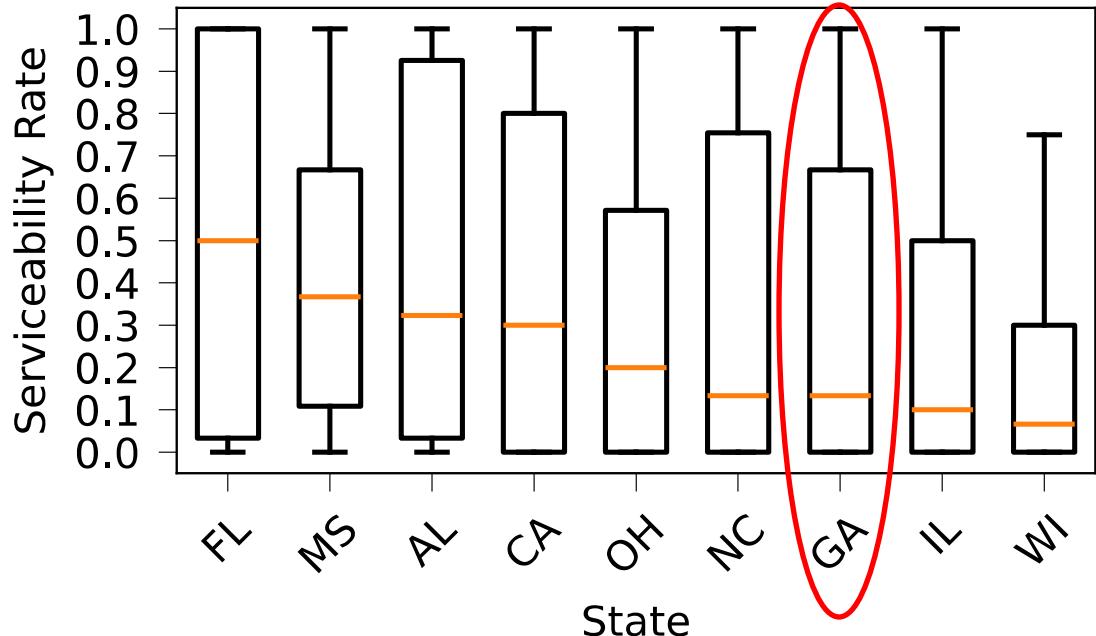


Remote rural
regions



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AT&T ignores the primary targets for the CAF program at least in Georgia --- **remote rural regions**

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Among the addresses served, all ISPs offer substandard broadband plans. AT&T and Frontier are the worst offenders.

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Frontier Internet service is not provided based on speed tiers or other level of performance and Frontier does not guarantee that you will be able to perform any particular Internet activity with the service. For

details see: frontier.com/internetdisclosures. Requires Auto Pay or \$10/mo fee applies. Printed bill available for \$2.99/mo. Fee does not apply to select customers. Installation (\$100) and other applicable charges, additional services and taxes are extra & subject to change during & after the promo period. A \$50 equipment restocking fee per household applies when Internet is disconnected. A fee up to \$150 per device also applies if equipment is not returned. Service subject to availability. Price and terms subject to change. Cannot be combined with other offers. Other restrictions, Frontier policies and service terms apply.

download at least 10Mbps/upload at least 1Mbps

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Question 3: Are Regulated Monopolies Better?

Steps:

- Examine the plans received by people covered by monopolies to those received by unregulated monopolies (CAF)
- Determine whether the plans are on par with those in areas with multiple providers (competition)
- Focus on 7 states and collect non-CAF residential data from a dataset provided by Zillow
 - Remove addresses receiving no service
- Consider three types of CAF-served census blocks
 - Type A: CAF ISP is only operating in CAF and monopoly modes
 - Type B: CAF ISP is only operating in CAF and competition modes
 - Type C: CAF ISP is operating in all three modes

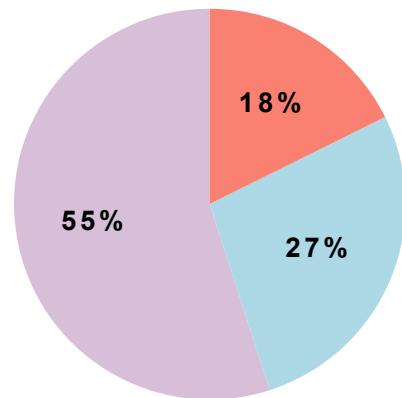
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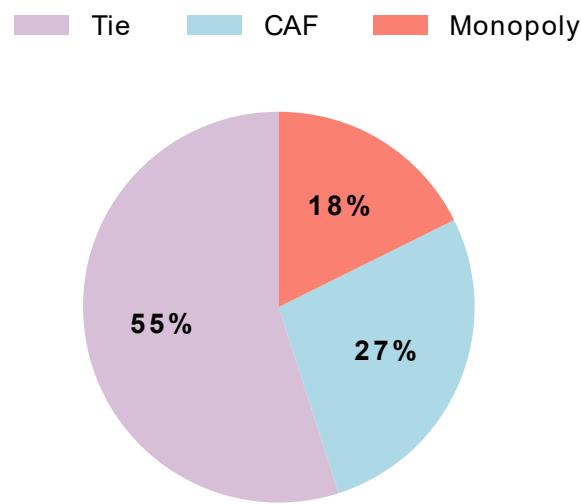
Tie CAF Monopoly



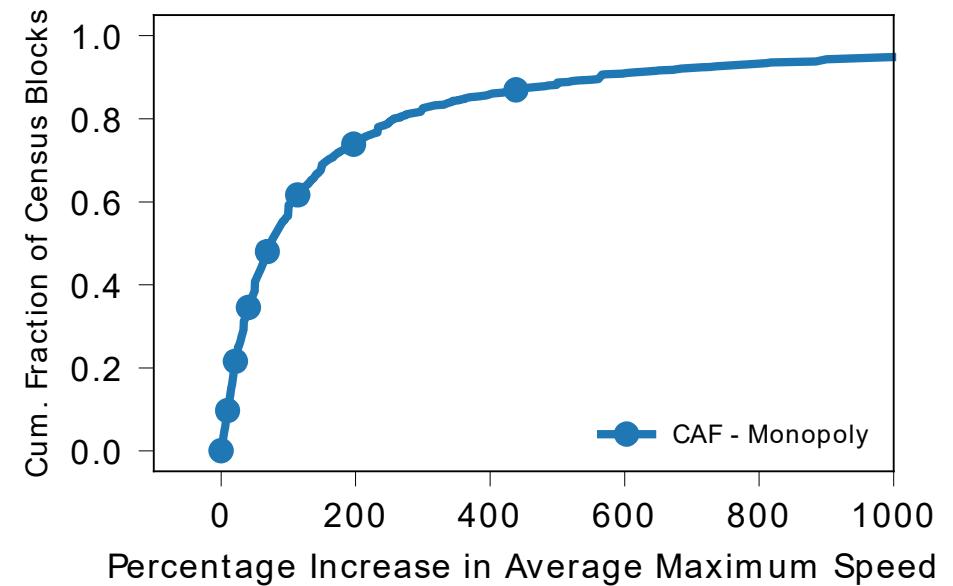
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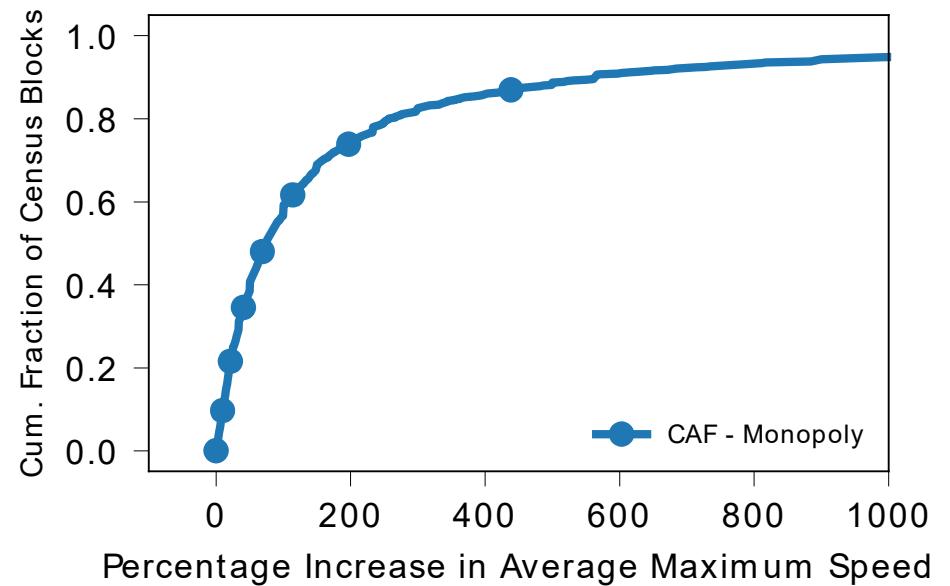
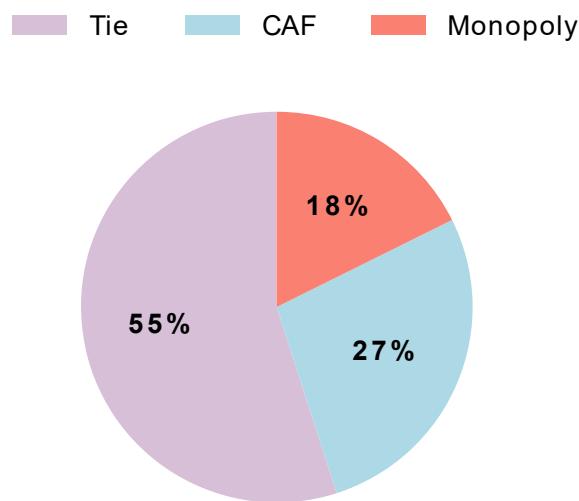
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For the 27% census blocks, where CAF is better, improvement is significant

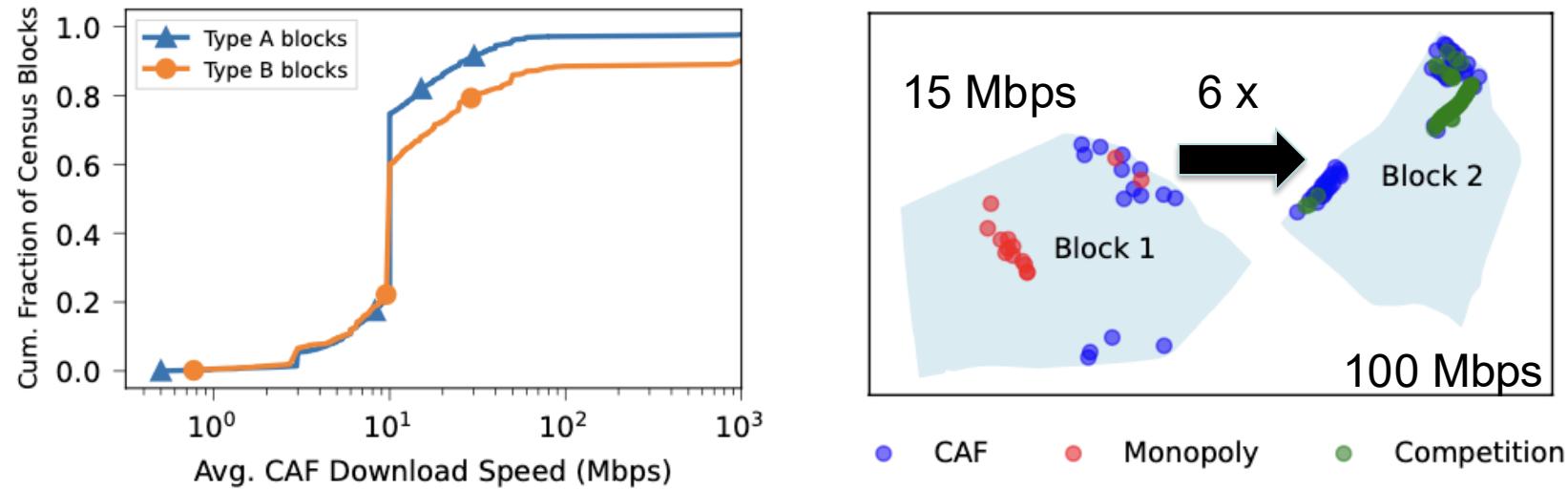
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Regulated monopolies are better only in a few census blocks.

Question 3: Are Regulated Monopolies Better?



Comparing the performance of CAF addresses across
Type A (CAF+Monopoly) and Type B (CAF+Competition)
blocks

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 - No, the overall compliance rate for service quality was 33%
- **Question 3:** Do regulated monopolies offer **better value** to users than unregulated ones?
 - Users received an improvement in broadband service, even if inconsistently (27% of the time)

Current and Future Efforts

Ongoing Work

- Assessing other policy interventions:
 - NY's affordable broadband act
 - Internet access in Colorado
- Expanding BQT to more ISPs
- Working with State government organizations in Virginia and California
- Working with Pew Research and the Institute for Self Reliance (ILRS)

Press and other coverage

- Harvard Law Review blog July 16, 2024
- Broadband Breakfast coverage July 12, 2024
- US Supreme Court Brief Submitted, Oct 12 2024
- Internet Society blog post, Nov 3rd 2024

Harvard Law Review > Blog > Blog Essays

INTERNET & COMMUNICATIONS LAW + BLOG ESSAY

JULY 16, 2024

Measuring Broadband Policy Success

HAARIKA MANDA
VARSHIKA SRINIVASAYARADHAN
LAASYA KODURU
KEVIN ZHANG
XUANHE ZHOU
UDIT PAUL
ELIZABETH BELDING
ARPIT GUPTA
TEJAS N. NARECHANIA

Berkeley
UNIVERSITY OF CALIFORNIA

BROADBAND BREAKFAST

ILive Opinion Community Club Digital Infrastructure



FUNDING

Study: CAF II ISPs Stopped Serving Many Locations After Funding Ended

While not a violation of FCC rules, a former deputy bureau chief said she was surprised to see such a drop off.

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INTERNET & COMMUNICATIONS LAW + BLOG ESSAY

JULY 16, 2024

Measuring Broadband Policy Success

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BLive Opinion Community Club Digital Infrastructure



FUNDING

Study: CAF II ISPs Stopped Serving Many Locations After Funding Ended

While not a violation of FCC rules, a former deputy bureau chief said she was surprised to see such a drop off.

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