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

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Does the “Net” Work for All?

- **Prevalence of Internet Access Inequity**
  - 10% of population cannot **afford** Internet due to high subscription cost[1]
  - 30M lack access to **performant** (high-speed) Internet; 40% in rural/tribal areas[2]

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

How Policymakers Influence Internet Access?

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
…	…	…

Connect America Fund (CAF) Program

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

- **Mechanism**
  - CAF subsidized ISPs in regions that lacked broadband internet access (6+ million addresses)
  - FCC specified expected service quality (10/1 Mbps) and price requirements

- **Certification**
  - ISPs certified addresses they served and speeds they offered (**self-reported!**)

How effective was the CAF program in expanding Internet access?

How to Measure Success?

Key Policy Questions

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

Fundamental Problem

BLOCKING COMPETITION —

ISP admits lying to FCC to

ISP ga

JON BRO

DECEMBER 10, 2020

CAPITO CAUTIONS FCC ON RDOF FUNDING FOR FRONTIER

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

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

Cost

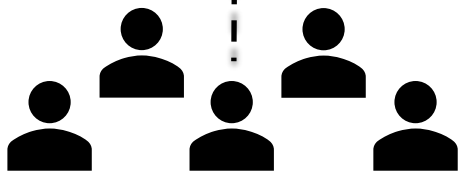
FEDERAL COMMUNICATIONS COMMISSION · USA ·

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

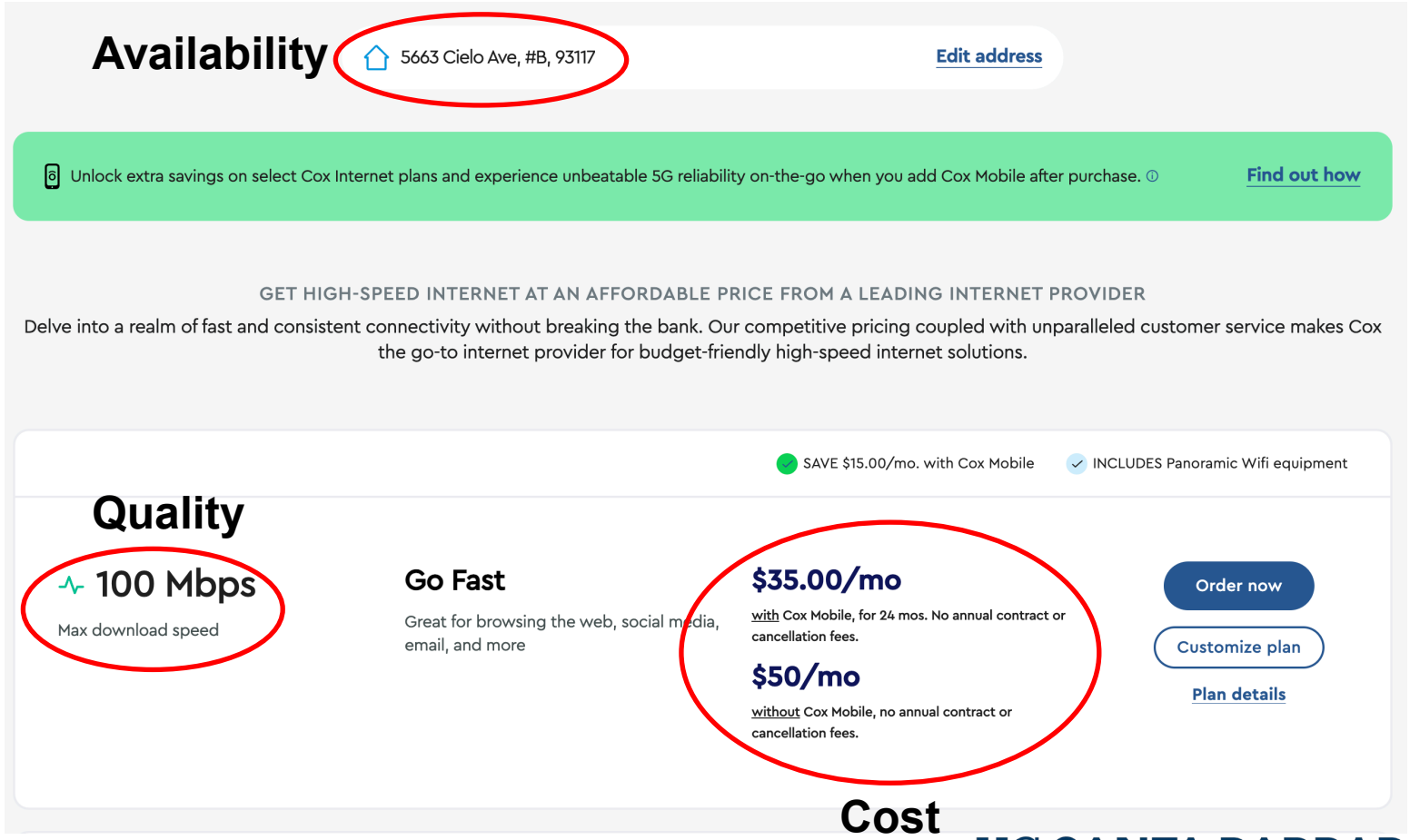
How can we address this ?

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

Service Availability, Quality, and Cost



Customers



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

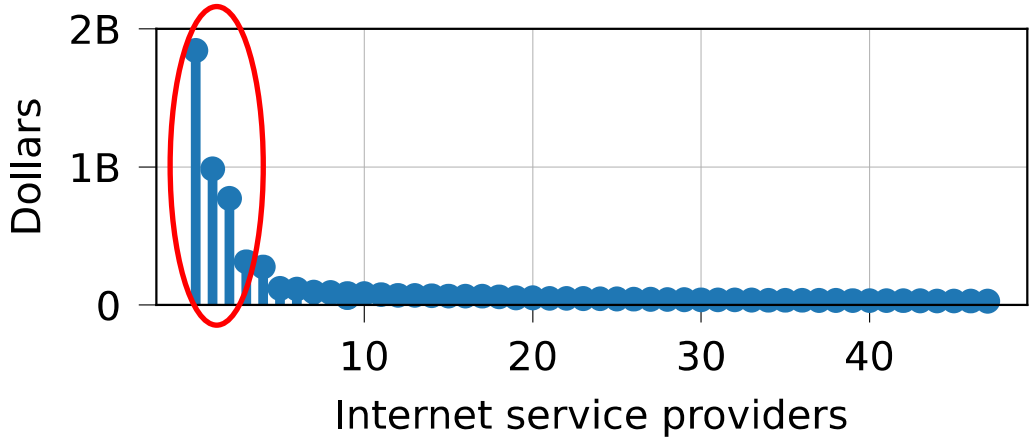
Automates querying ISPs' web interfaces at scale to extract advertised (**reliable**) broadband **availability**, **quality** and **affordability** at street-level granularity (**fine-grained**).

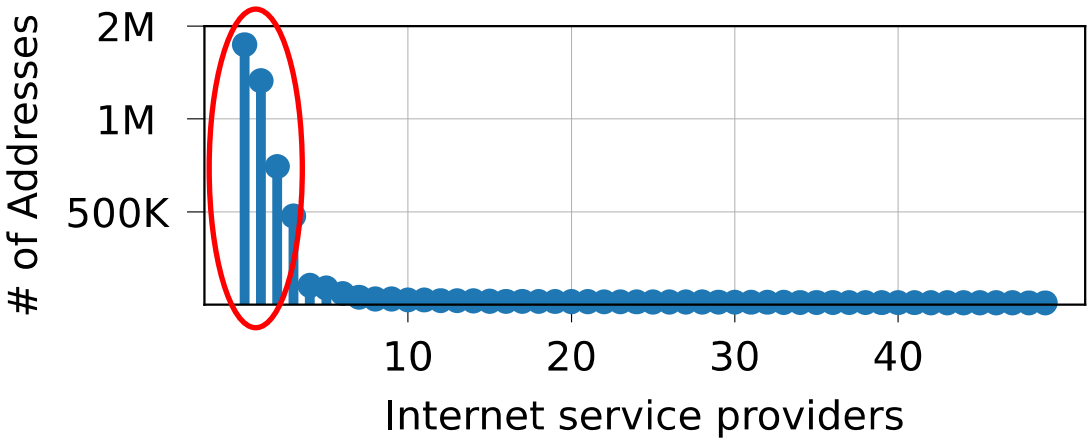
pricing	exec_time	service_status
{0: '500 Mbps\n500 Upload / 500 Download\n$39....	60.02	Serviceable
{0: '25 Mbps\nSpeeds up to 25 Mbps\n$39.99\n/m...	70.32	Serviceable
{0: '3 Mbps\nSpeeds up to 3 Mbps\n$39.99\n/mo\...	86.06	Serviceable

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

New CAF Dataset: Certified vs. Advertised Information

Top few ISPs served most addresses and received most of the funding





What 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

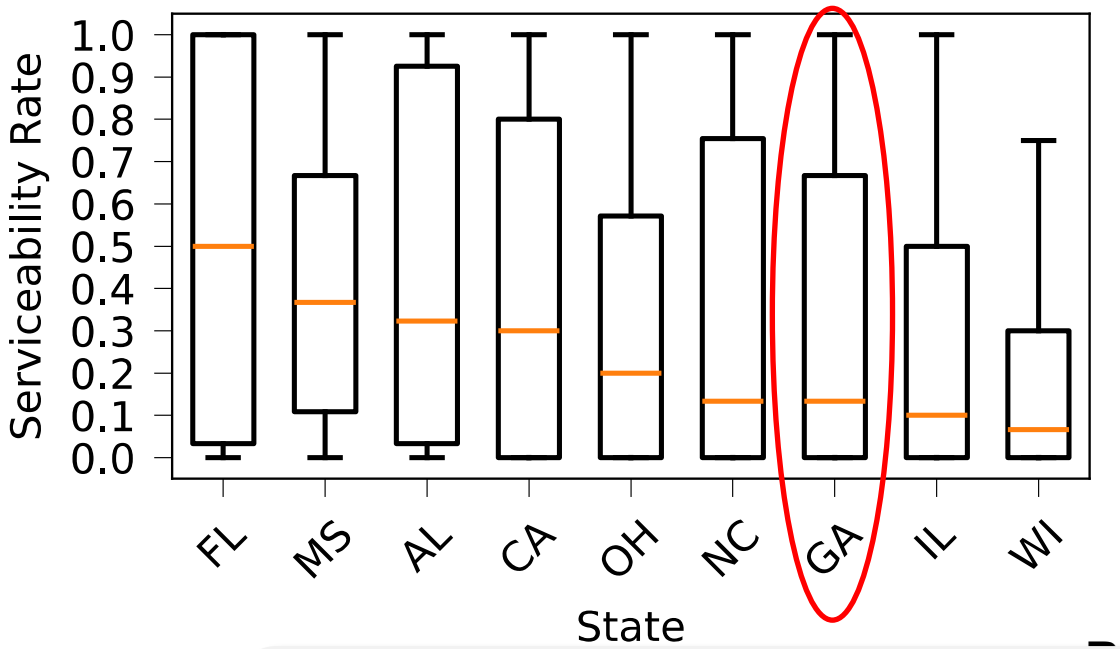
Question 1: Are ISPs Truthful?

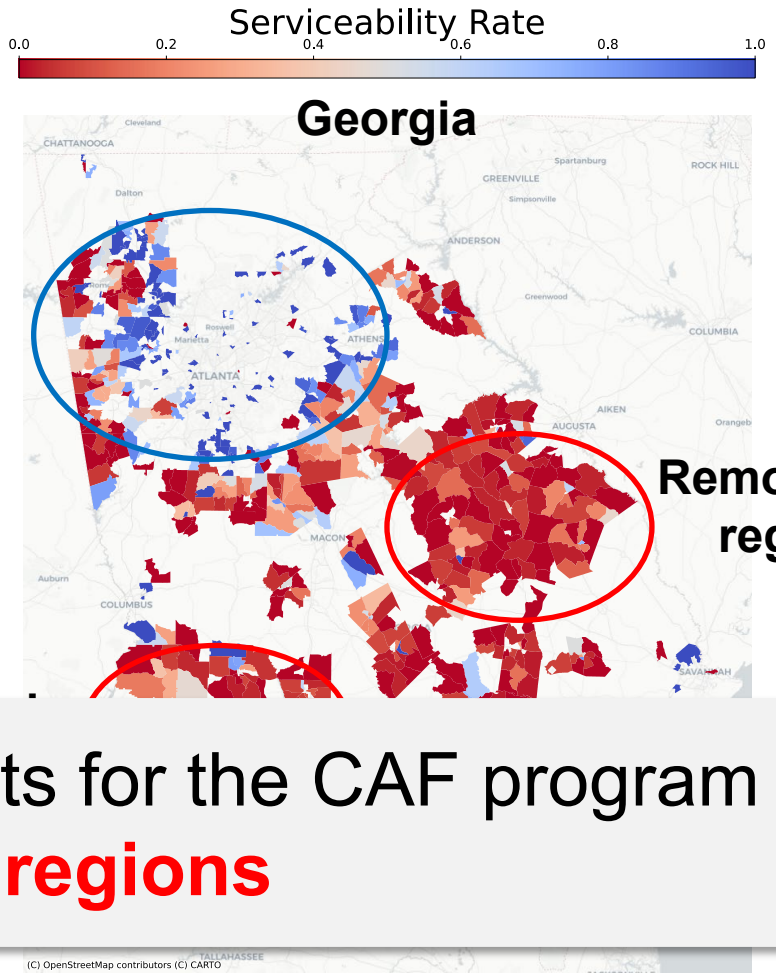
After collecting data using our BQT tool, there was an overall serviceability rate of only 55.45%.

ISPs	Serviceability Rate (%)
AT&T	**31**
CenturyLink	**90**
Frontier	**70**
Consolidated	**84**

Question 1: Are ISPs Truthful? – let's focus on AT&T

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





AT&T ignores the primary targets for the CAF program --- **remote rural regions**

Question 2: Are ISPs compliant with speed and price requirements?

We observe an aggregate compliance rate of only 33.03%.

ISPs	Serviceability Rate (%)	Compliance Rate (%)
AT&T	**31%**	**17%**
CenturyLink	**90%**	**69%**
Frontier	**70%**	**15%**
Consolidated	**84%**	**84%**

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

Question 3: Are Regulated Monopolies Better?

Steps:

- Examine the plans received by people covered by monopolies to those received by unregulated monopolies (CAF)

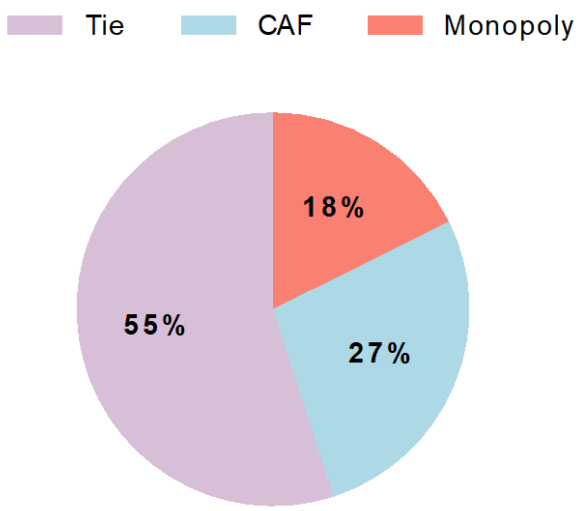
- Determine whether the plans are on par with those in areas with multiple providers (competition)

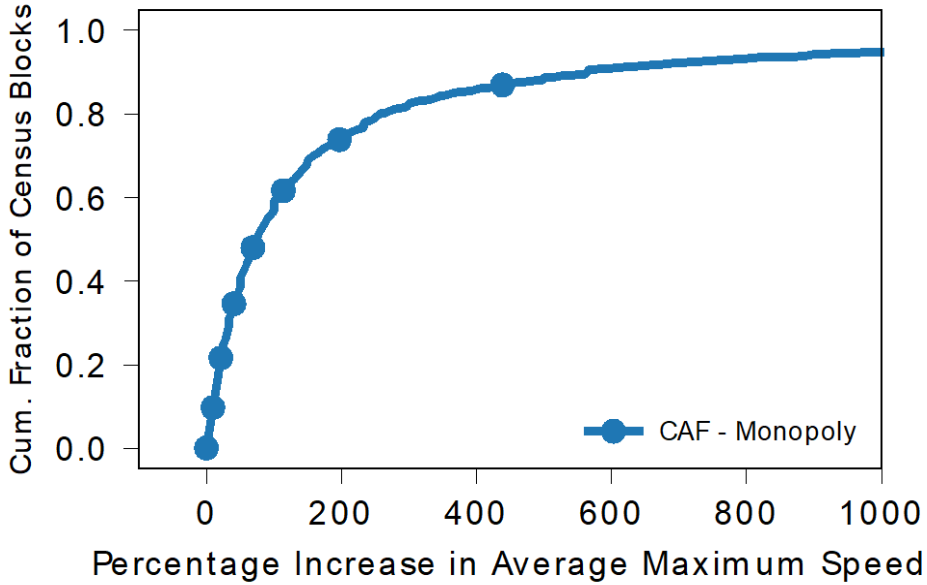
- Focus on 7 states and collect non-CAF residential data from a dataset provided by Zillow
  - Remove addresses receiving no service

- 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

Question 3: Are Regulated Monopolies Better?

Do regulated monopolies offer better value to end users than unregulated ones?





Regulated monopolies are better only in a few census blocks.

Let's Revisit Our Questions …

- **Question 1**: Are ISPs **truthful** about all the addresses they certify as served?
  - No, only 55% of addresses we surveyed received service from the ISP
- **Question 2**: Do ISPs always **comply** with FCC's service quality and rate requirements?
  - 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

Current and Future Efforts

Ongoing Work

- Assessing other policy interventions:
  - NY's affordable broadband act
  - Internet access in Colorado
- Expanding BQT to more ISPs

Press and other coverage

- Harvard Law Review blog July 16, 2024
- Broadband Breakfast coverage July 12, 2024
- Internet Society blog post in the works

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Harvard Law Review > Blog > Blog Essays

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Measuring Broadband Policy Success

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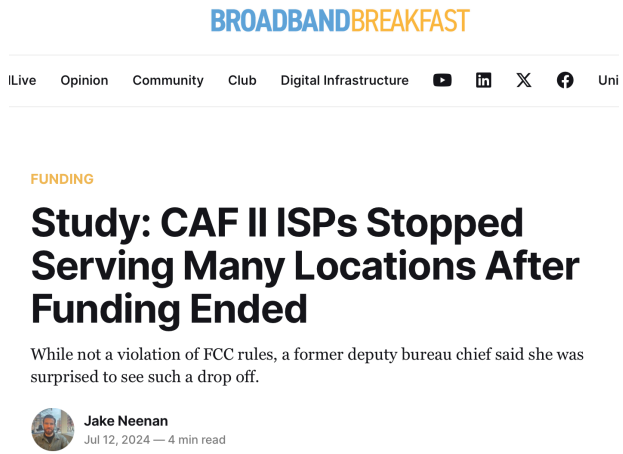
BROADBANDBREAKFAST

lLive Opinion Community Club Digital Infrastructure Uni

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.

Jake Neenan
Jul 12, 2024 — 4 min read

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