Enabling Data-Driven Broadband Policymaking using BQT+

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How do we Build Transparent Broadband Data Infrastructure?

Internet Service Providers

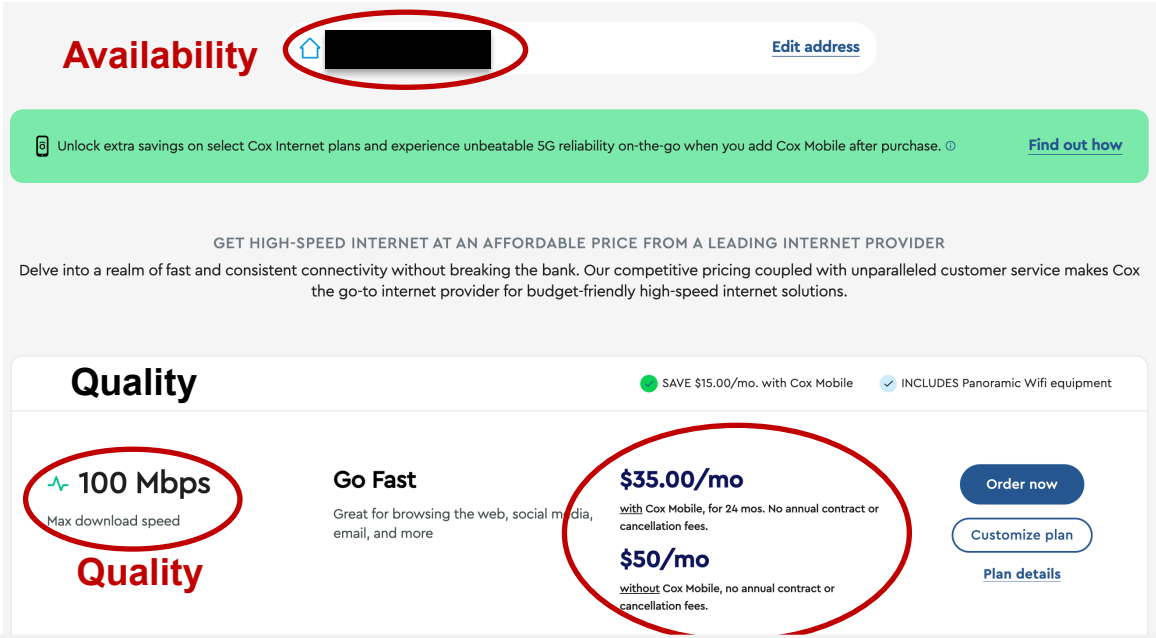
Policymakers

Unreliable & Noisy

Internet Availability, Quality, and Cost

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

How Do We Build Transparent Broadband Data Infrastructure?



Independent querying enables verifiable, address-level broadband data

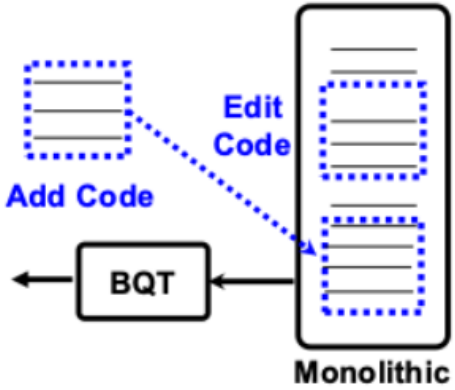
BQT Operationalizes Independent Querying at Scale

- Automates ISP interface querying
- Street-level granularity

Transparent broadband data infrastructure

Policy workloads demand Extensibility and Robustness

- **BEAD** → Must extend querying to many more ISPs (**extensibility**)
- **Affordability** → Longitudinal monitoring, non-experts running repeated queries (**robustness**)



BQT cannot keep up with evolving policy workloads

Problem Statement

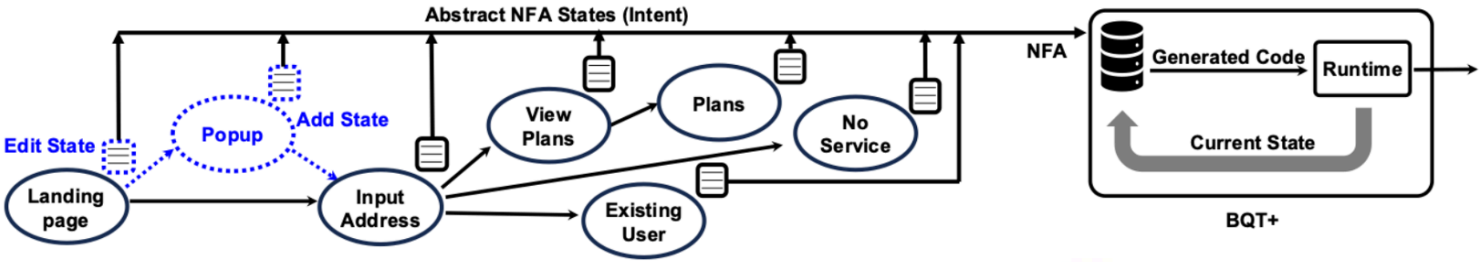
How can a querying system enable **non-technical** users to sustain **longitudinal**, address-level data collection across **evolving ISP interfaces**?

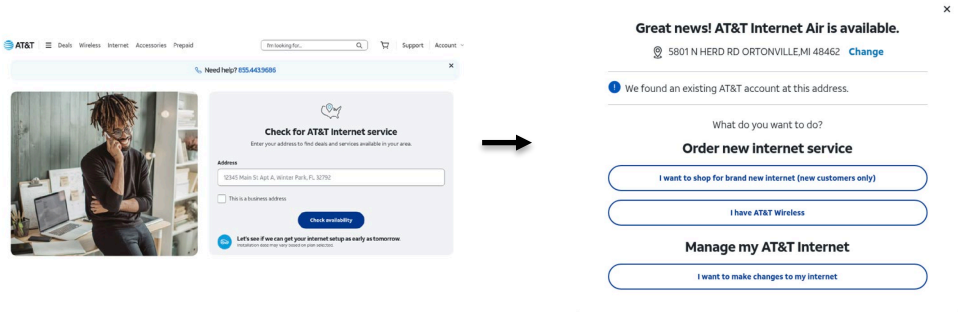
BQT+'s Key Design: Disaggregation

- **Intent:** what we want to measure
- **Execution:** how interface is traversed
- **NFA** enables dynamic branching

Natural Language Intent Authoring (agentic authoring)

```
prompts = [
...
StatePrompt(
    name="Handle Existing Customer Question",
    description="Handle the question about existing
        AT&T customer",
    triggers=["If asked 'Are you an existing AT&T
        customer?' or similar"],
    actions=["Click 'No' or 'New Customer' button",
        "TERMINATE AT THIS POINT"],
),
...
]
```





Extensibility and Robustness in Practice

- Adding ISPs require localized changes
- Interface churn does not trigger rewrites

Lines of Text to Generated Lines of Code Ratio

Can sustain longitudinal, address-level data collection across heterogeneous ISPs

Policy Impact: Virginia Case Study

- 62k addresses analyzed
- Only **4.5% of CBGs** have affordable plans
- Findings directly informed legislative action

Sustained longitudinal data collection is essential for tracking affordability

K.Allmann, E.Belding, A.Gupta, L.Koduru, T.Narechania, A.Nguyen. Beyond Access: Broadband Affordability & Adoption. 2025. Virginia General Assembly.

Policy Impact: BEAD Monitoring

- 4 states, 64 ISPs, 62k addresses
- Identified **availability** and **affordability** gaps

Sustained longitudinal data collection is essential for BEAD oversight

H.Galperin, F.Bar, A.Gupta, E.Belding, L.Koduru. Broadband Affordability and the BEAD Program: Analysis and Policy Recommendations. 2025 MEDIA Project Phase 3 USC Annenberg.

Summary

- BQT+ is **robust**, **extensible**, **lowers technical debt**, supports policy workloads
- BQT+ enables a **transparent broadband data infrastructure**
- **Next step:** Release BQT+ as a service, with easy-to-use interfaces for non-technical users

Independent broadband data is infrastructure