



Boston Human Rights Commission

Broadband Access in Boston Project Report PART 2

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1. Comcast’s Fiber Infrastructure in Boston

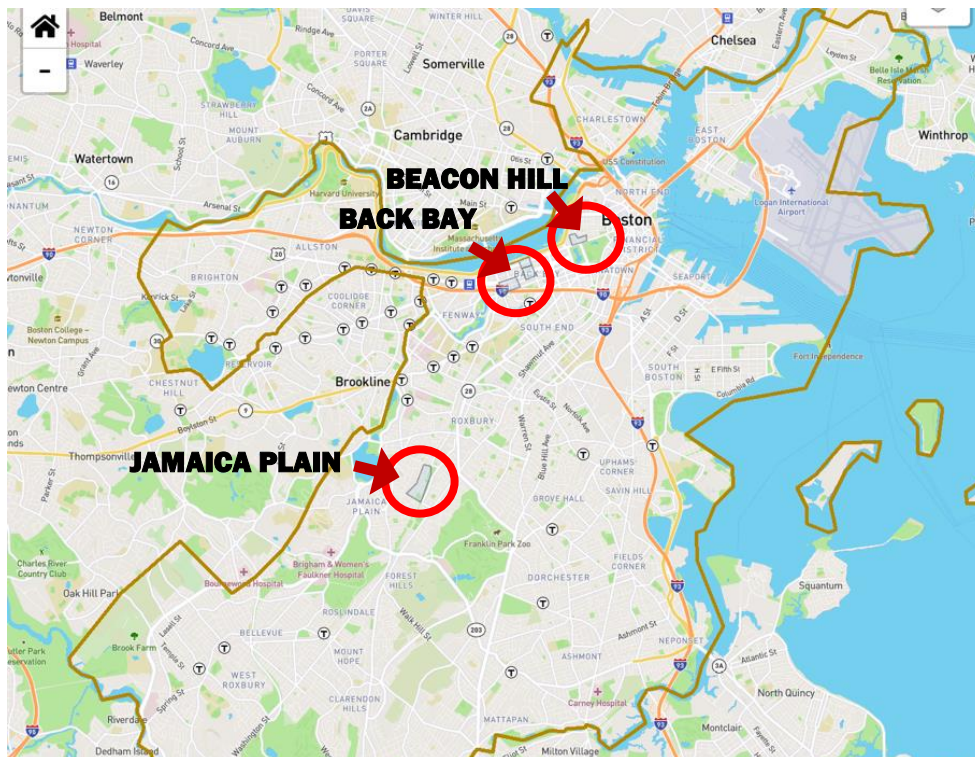
When did Comcast begin laying Fiber in Boston/what year?

No official records nor internet media coverage were found about when exactly Comcast began installing its fiber infrastructure in Boston. However, [Comcast was the first Internet Service Provider with whom the City of Boston signed an agreement in 2008](#) to develop the city’s “BoNet,” which is Boston’s fiber network for municipal use. The city formalized a subsequent agreement with [Verizon after this company began building its fiber network in 2016](#).

Where did we get information that it skirted Mattapan when it was laying fiber and what year was it? Did it lay fiber in Dorchester?

According to the [13 Connectivity Explorer](#) database, Comcast’s fiber infrastructure covers only five block groups of the City of Boston (three of them are located in Back Bay; one in Jamaica Plain; and one in Beacon Hill). This coverage equates to 0.9% of the city’s total block groups. Comcast does not have fiber neither in Mattapan nor in Dorchester, as the following map shows.

Map 1. Location of the five block groups in Boston, which Comcast’s fiber infrastructure serves.



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2. Methods for Determining Speed Rates

Background

According to data available at the *I3 Connectivity Explorer* platform, the speed rates Boston residents are receiving are often slower than those their Internet Service Providers (ISP) offer: only 62% of the speed tests conducted in the city for over one year (April 2020 to January 2021) proved actual speeds to meet target speeds of 25 Mbps (below MA average of 73%).

However, little is known about *how this figure looks in each of the 23 Boston neighborhoods*. The *I3 Connectivity Explorer* does not provide information at the neighborhood level. In other words, the question about how Boston residents are experiencing such a speed problem *per neighborhood* remains unanswered. This information is crucial because it would help identify patterns of discrimination by relating speed rates to each neighborhood's socioeconomic and racial profile.

Why measuring neighborhoods' broadband speed rates should be done household by household?

Most fixed broadband signals are password-protected, given that they encompass specific [IP addresses](#).¹ Generally, each household has a unique IP address. Hence, measuring a particular neighborhood's average speed rate entails **testing a representative number of homes and ISPs** within its jurisdiction.

Ensuring that samples are representative is essential for getting *valid* results. A representative sample of a neighborhood's households seeks to reflect the characteristics of such a neighborhood both in terms of the number and attributes of households and ISPs serving the neighborhood. In other words, samples should test a sufficient number of households of different attributes, locations, and various ISPs.

There are two ways for measuring speed rates by household: (1) through a device installed in the household's router or (2) by having customers use a speed test app. Alternatively, (3) measurements can draw on the Federal Communications Commission (FCC) administrative data.

The following table provides an overview of these three methods currently available to measure *a neighborhood's* actual performance speeds against what the ISPs advertise to customers. It also analyzes the methods' pros and cons.

¹ An IP is a unique number assigned to all information technology connected devices such as printers, routers, and modems. The IP address identifies and allows these devices to communicate with each other on an internal or external computer network. Any device that transmits or receives internet traffic will be assigned an IP address.

Methods for determining broadband speed rates per neighborhood

1. Per household speed testing with built hardware

Overview: A built hardware is installed in the household's router (for example, see the [Whitebox by SamKnows](#)). This device conducts hourly tests of the household's broadband upload speed, download speed, and latency, among other performance metrics. The test results are then collected and analyzed through specialized software.

Pros: This method provides reliable results given that it measures speed rates directly at the source. As the device operates autonomously (it does not require users' attention), measurements are consistently taken on the same timeslots, ensuring comparability across households.

Cons: Costs of devices and engineering teams installing and supervising their functioning can be high if multiplied for many households. Hence, this method's costs can significantly *compromise sample representativeness, thereby leading to invalid results.*

2. Per household speed testing with a speed test app

Overview: A household member downloads a speed test app on his/her/their mobile phone (for example, see [Meteor by OpenSignal](#)) and then measures speed rates at different timeslots during the day. The app saves the test results over time and provides a speed average.

Pros: This method provides reliable results given that it measures speed rates directly at the source. Speed test apps are free for Android or Apple devices; therefore, the method does not entail high operation costs.

Cons: User dependency to operate the speed test app compromises consistency of measurements over time. Engaging with users and coordinating their data collection and further analysis could be a lengthy process.

2. Administrative records **Overview:** The FCC measures broadband speed rates across the country through (a) [per household testing with built hardware](#) and (b) in April 2021, it also [released its speed test app](#). Furthermore, (c) the FCC requires ISPs to report on the speeds they provide through [Form 477](#).

Even though the FCC makes the results of some of these tests available through the [annual Measuring Fixed Broadband report](#), this report does not disaggregate information by neighborhood. Additionally, most of the report's data rely on Form 477 (data provided by ISPs), which may be biased. As the FCC's data on speed rates by neighborhood is not publicly available, the Boston Human Rights Commission can ask the FCC to provide such information for the City of Boston.

Pros: FCC's data (testing with built hardware and speed test app) provides reliable results. Since no additional speed measurements are required, this, therefore, involves no operational costs and time for Boston.

Cons: FCC's reluctance to provide such information.

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3. Comments on Boston-CTC Broadband Equity Study

The CTC’s proposal to evaluate Boston’s current and potential future broadband environment (CTC Proposal) addresses various issues of concern in Boston’s broadband market. One strength is that it seeks to provide a clearer understanding of the speed rates that the city’s households are *actually* getting (*vis-à-vis* those they contract with providers). The proposal will also expand our current knowledge about how to best support existing digital equity programs.

At the same time, there are several aspects directly related to human rights concerns, which fall outside the methodological scope of the CTC Proposal. Importantly, *the proposal does not look at patterns of discrimination in broadband access*. This is so because (1) it does not integrate the experiences of the most marginalized groups in the city and (2) it conducts an in-depth analysis of speed reliability to only one internet provider (Comcast) [from a speed threshold \(50 Mbps\) that no longer meets the current needs of a single household](#).

To be precise, the CTC Proposal fails to identify patterns of discrimination for the following reasons:

- (1) *The proposal’s tasks 1 (particularly, subtasks A and C) and 3 do not consider the experiences of the city’s most marginalized groups*. This is a major blind spot because, for example, even when [users have reiteratively denounced paying additional fees to the monthly price beyond what companies advertise](#), CTC proposes to conduct interviews and other data collection tools only to representatives of Comcast, Verizon, RCN and Starry, city officials, and nonprofits’ personnel.

Given that the CTC analysis is unlikely to capture users’ persistent and interlocking exclusionary experiences in broadband provision, its findings will not help identify nor understand the underlying disadvantages that undermine the achievement of digital equity in Boston, especially for the most disenfranchised groups.

- (2) *While CTC Proposal’s subtask C (of task 1) aims to determine whether “systemic performance issues exist” in broadband service throughout the city, the analysis is concerned with only one internet provider*. By solely analyzing Comcast’s service reliability through an unrepresentative sample of cases (24 residences), the proposal fails to comparatively assess performance issues across the city’s providers, technology types, neighborhoods, and demographic profiles.





Further, it also ignores concerns over how insufficient broadband speed thresholds (50 Mbps) prevent household members from fully participating in society—particularly families whose wellbeing depends on medical and assistive devices requiring an internet connection.

Therefore, the proposal’s findings will not help illuminate systemic performance issues driving Boston’s current digital divide.

For these reasons, the CTC Proposal should not inform decision-making aimed at addressing discrimination in Boston’s broadband market. While the proposal will provide some clarity in specific areas of concern, it will not help identify nor understand the systemic issues that restrain the city from achieving digital equity and realizing related human rights.

Crucially, conducting an additional study with a methodological proposition capable of capturing patterns of discrimination could overcome such a problematic knowledge gap. Only by clearly understanding the underlying disadvantages keeping residents from accessing reliable broadband, would policies be better equipped to address the city’s digital divide for *all* in an equitable and lasting way.

Comments to the CTC Proposal (Aspects Related to Human Rights Concerns)

Components of the CTC Proposal

Comments on Aspects Related to Human Rights Concerns

Task 1 – Analyze Boston’s Current and Projected Future Broadband Environment

Subtask A: Outreach and Research

Objective:

To collect information about Internet Service Providers’ footprints and pricing, their plans for expansion and updates.

Data Collection:

(1) Interviews with representatives of Comcast, Verizon, RCN, and Starry.

(2) Collect pricing from provider websites and by contacting the providers’ customer support specialists.

Collecting data solely from providers is problematic because [broadband companies tack on additional fees to bills, ultimately jacking up the monthly price beyond what’s advertised](#). Service providers also vary prices according to the specific terms of contracts.

The CTC study will not capture these situations even though they significantly undermine the achievement of digital equity in Boston. To overcome such an analytical gap, **it is highly desirable that the study also incorporates consumers’ pricing experiences**. This could be done by collecting information from consumers’ bills, as a [study from the Wall Street Journal did](#).

Subtask B: Online Speed Test

Objective:

To identify speed rates from Boston households, with a focus on areas where service is problematic.

Data Collection:

(1) Survey of speed rates through a customized speed test website (1-year operation).

By measuring speed rates in a vast number of households in Boston, this method could yield a clearer picture of current broadband reliability in the city—compared to testing speeds in only 24 residences (as Subtask C of the CTC Proposal suggests).

Therefore, in this Subtask B it is crucial to get a representative sample of the city by encouraging high levels of participation among residents of the 23 neighborhoods.

The proposed speed test website also provides an opportunity for asking other relevant data from residents, such as their broadband bills (to assess pricing) and demographic composition. An example of this data collection method is the [Let’s Broadband Together initiative by Consumer Reports](#).

Subtask C: Home Speed Testing

Objective:

To gain insight into the potential cause of reported user dissatisfaction or problems and determine whether systemic performance issues exist with Comcast’s broadband service throughout the City.

Data Collection:

(1) Test internet speeds at up to 24 Boston residences through a built hardware, all served by Comcast with advertised download speeds of at least 50 Mbps.

While the CTC Proposal aims to determine whether “systemic performance issues exist” in broadband service throughout the city, it conducts an in-depth analysis of speed reliability to only one internet provider (Comcast) from a [speed threshold \(50 Mbps\) that no longer meets the current needs of a single household](#).

More specifically, by solely analyzing Comcast’s service reliability through an unrepresentative sample of cases (24 residences), the proposal fails to comparatively assess performance issues across the city’s providers, technology types, neighborhoods, and demographic profiles. It also ignores concerns over how insufficient broadband speed thresholds (50 Mbps) prevent household members from fully participating in society—particularly families whose wellbeing depends on medical and assistive devices requiring an internet connection.

24 residences constitute no representative sample—neither quantitatively nor qualitatively—of Boston’s [269,522 households](#) and 23 neighborhoods.

Task 3 – Evaluate Boston’s Digital Equity Programs and Initiatives

Objective:

To make recommendations for expanding or creating new digital equity programs by evaluating those that currently exist in Boston which focus on broadband affordability, device access, and digital skills.

Data Collection:

Interview city officials and other related program personnel.

Engaging with *all* program’s stakeholders is key for program evaluations to yield comprehensive findings and reliable recommendations. The CTC Proposal misses to collect data from the experiences of program’s recipients. In doing so, its findings may provide an incomplete picture of how well such programs are performing and why.

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4. Closing the Digital Gap? An Analysis of Project OVERCOME

Background. [Project OVERCOME](#) is a program managed by [US Ignite](#) and funded by the [National Science Foundation \(NSF\)](#) with [Schmidt Futures](#). It aims to create an innovative environment for seven communities to test locally accelerated solutions designed to deliver community internet connectivity within 12 months.

In March 2021, US Ignite announced the names of the seven communities chosen to deploy connectivity solutions and to which Project OVERCOME provided a \$2.7 million grant. Figure 1 locates these communities.

Figure 1. Location of communities supported by Project OVERCOME.



Strengths. The seven projects that Project OVERCOME supports reflect a mix of density, demographics, income levels, regions of the United States, housing types, local and industry collaborations, and technical approaches. Therefore, their implementation will provide valuable lessons on how to design best a policy strategy capable of addressing the specific challenges, needs, and potentials of underserved communities. Social scientists will oversee and study how the seven projects unfold to document and garner such learnings.

Furthermore, the projects will test how different technologies—beyond cable and fiber—fulfill people's digital needs.

By supporting local communities that have worked on closing the digital gap for years, Project OVERCOME affirms the importance of their involvement. It helps demystify that prominent private actors (corporations) are the only ones capable of managing and providing internet access. The project also promotes good stewardship across communities, academic centers, local authorities, and small and medium enterprises.

Weaknesses. After the 12 months of support from Project OVERCOME, it is not clear how the seven communities will continue to run financially.

The question about the broadband speed rates that the seven projects will deliver is neither addressed. Even though granting broadband access is indeed a priority, the importance of ensuring high speed and reliability should not be neglected. Low-speed rates (usually below 100Mbps) do not fulfill people's needs and thus prevent them from realizing human rights for which a digital connection is essential.

Also, Project OVERCOME is still a small-scale endeavor. While its \$2.7 million grant for seven communities is comparable to other philanthropic efforts (for example, [King County's 2 million in grants](#)), and even higher than [Boston's Digital Equity Fund \(\\$500 thousand\)](#), it is meager compared to the investment needed for reaching most underserved communities. To put this into perspective, [Chicago invested \\$50 million](#) to provide broadband to families in need on the city's South and West Sides. [Fontana Unified School District in California invested \\$40 million](#) to build out a private wireless network for some 36,000 students. Compared to the magnitude of investments made by the private sector, Project OVERCOME's effort looks even smaller. [Verizon invested \\$300 million](#) in the City of Boston's fiber infrastructure.

Project OVERCOME's impacts are also small-scale. The seven winning projects seek to connect a range of 50 to 350 households, which constitute between 0.12% to 1.05% of the locations' total number of households (please, see Annex 1 for more references).

By exclusively focusing on how to serve communities, which have been excluded from the mainstream broadband provision model, Project OVERCOME runs the risk of being a "gap-filler" rather than a "game-changer." In other words, if lessons learned from Project OVERCOME do not resonate at high decision-making levels, its existence will deflect attention from the structural causes behind the country's digital divide (the power asymmetries between consumers and corporations).

Opportunities. During the [online announcement of Project OVERCOME's seven winning communities](#), [Eric Schmidt \(co-founder of Schmidt Futures\)](#) mentioned that Project OVERCOME's partner organizations will advocate for real policy reform at the federal level. Such an advocacy effort could constitute a platform for articulating local-level concerns on the digital divide at high decision-making levels.

Analysis of Project OVERCOME

Project OVERCOME Winner	About the Community	Project Partners	Type of Technology & Impact
Buffalo, New York	<p>The Fruit Belt encompasses a 200-year-old community on the east side of Buffalo.</p> <p>Persons in poverty, percent: 30.1%</p> <p>Households without an internet subscription, percent: 25.4%</p>	<ul style="list-style-type: none"> - Fruit Belt community - University at Buffalo 	<p>Technology: Long-Term Evolution (LTE) antennas, which will broadcast signals using Citizens Broadband Radio Service (CBRS) spectrum (this will create a Wi-Fi network for home internet access).</p> <p>Impact: 140 households (0.12% of the City of Buffalo's total number of households).</p>
Cleveland, Ohio	<p>Cleveland has the lowest rates of broadband access among the large cities in the United States.</p> <p>Persons in poverty, percent: 32.7%</p> <p>Households without an internet subscription, percent: 31.6%</p>	<ul style="list-style-type: none"> - Cleveland-based nonprofit Digital C 	<p>Technology: Millimeter wave (mmWave) technology with wireless equipment installed on rooftops to create a mesh network.</p> <p>Impact: 225 households (0.13% of the City of Cleveland's total number of households).</p>
Detroit, Michigan	<p>Persons in poverty, percent: 35%</p> <p>Households without an internet subscription, percent: 35.6%</p>	<ul style="list-style-type: none"> - Detroit-based nonprofit Detroit Community Technology Project (DCTP) - Grace in Action Collectives (local communities) - 123NET (technology company) 	<p>Technology: Aerial fiber lines hung directly to residential homes, which trained residents will install.</p> <p>Impact: One southwest Detroit neighborhood (an area home to many low-income immigrants and Black and Brown families).</p>



<p>Loíza, Puerto Rico</p>	<p>Loíza is located on the northeastern coast of Puerto Rico.</p> <p>Persons in poverty, percent: 48.2%</p> <p>Households without an internet subscription, percent: 27.3%</p>	<ul style="list-style-type: none"> - Libraries Without Borders US - Link Puerto Rico - Municipality of Loíza - Other local organizations 	<p>Technology: 4G and 5G cellular hotspots.</p> <p>Impact: 90 households (1.05% of Loíza’s total number of households).</p>
<p>Blue River, Oregon</p>	<p>Blue River, the hub of the McKenzie River Valley, is located in rural Lane County.</p> <p>Persons in poverty, percent: 13.9%</p> <p>Households without an internet subscription, percent: 14.9%</p>	<ul style="list-style-type: none"> - Nonprofit Onward Eugene - McKenzie School District - Private-sector technology company Elevate Technology Group 	<p>Technology: A solar-powered terrestrial communications power will distribute a cellular wireless network using Citizens Broadband Radio Service (CBRS).</p> <p>Impact: Information not available.</p>
<p>Clinton County, Missouri</p>	<p>Persons in poverty, percent: 9.9%</p> <p>Households without an internet subscription, percent: 20.6%</p>	<ul style="list-style-type: none"> - Missouri University of Science & Technology - University of Missouri Extension - Worcester Polytechnic Institute - United Electric Cooperative/United Fiber - Maximize NWMO 	<p>Technology: Combination of multiple wireless technologies into a single architecture using Radio Frequency (RF)-over-Fiber technology.</p> <p>Impact: 50 households (0.61% of Clinton County’s total number of households).</p>
<p>Yonkers, New York</p>	<p>Yonkers is the gateway between New York City and the Hudson Valley.</p> <p>Persons in poverty, percent: 14.9%</p>	<ul style="list-style-type: none"> - Westchester County Association - City of Yonkers - STEM Alliance - Yonkers Partnership in Education (YPIE) 	<p>Technology: Citizens Broadband Radio Service (CBRS).</p> <p>Impact: 250-350 households (0.33-0.46% of Yonker City’s total number of households).</p>



[Households without an internet subscription, percent](#): 20.0%

- [Fordham University](#)
- [Westhab.](#)

5. Expert Interview: The Benton Institute for Broadband and Society

Background

At the request of Chairwoman McKenna, an interview to [John Horrigan](#) was conducted on October 7th, 2021. John is a Senior Fellow of the Benton Institute for Broadband and Society. He is a national expert on technology adoption, digital inclusion, and evaluating the outcomes and impacts of programs designed to promote communications technology adoption and use.

Summary of Interview Key Points

Which US cities have closed the digital gap ?	<p>There are cities where there's a well-developed infrastructure of community institutions to try to close digital access gaps. And a lot of that is focused on getting low-cost internet subscription offers to low-income households who need it.</p> <p>For example: Kansas City; the City of Seattle; and San Antonio. Philadelphia has used funding from 2011 to set up a reasonably good community infrastructure called PHLConnectED. connected.</p> <p>Cities where there is Comcast Internet Essentials tend to do a little bit better with broadband adoption rates among low-income households than cities where there are not robust low-cost internet offers.</p>
Which actors are key for closing the digital gap?	<p>Institutions like community, nonprofits, local public libraries. Organizations that have a presence in low-income communities, serving to get the word out to community members about discount offers.</p>
Which approaches to broadband provision are useful for ensuring access?	<p>A promising approach are local wireless mesh networks, which are networks aimed at low-income neighborhoods.</p> <p>That is a strategy that's been used in Baltimore. In Pittsburgh, Carnegie Mellon University has supported that in several neighborhoods.</p>

However, I don't know that there's been research that necessarily validates it as a good approach or not; but I think there's a lot of promise to it.

His viewpoint on municipal broadband

The municipally owned wireline fiber network gets at competition. By providing a competitive alternative to an incumbent cable provider, municipally owned networks offer lower prices for some.

However, it is usually not the case that the prices fall enough to get into the range of affordability for very low-income households.

Do wireless mesh networks provide high speed rates (beyond the standard of 25 Mbps)?

My understanding is that, yes, they can do better than 25 Mbps. How much better depends on a lot of factors in the particular neighborhood (for example: lines of sight between the tower beaming the signal and to households).

What happens in many low-income households is that they rely either on a wireline broadband subscription or a smartphone plan to get online. But there are data caps on monthly cellular data plans. That means you can't do zoom, you can't do school, you can't do streaming, because you'll eat through the data caps. The wireless mesh networks get around this problem because they are uncapped.

Do you know of any discrimination suits against providers?

I haven't found many of them. I know there is a [redlining lawsuit in Cleveland](#). The [National Digital Inclusion Alliance](#) (NDIA) did some analysis of speeds in the city of Cleveland and found a pattern by which low-income neighborhoods had low speeds relative to upper income neighborhoods. The NTIA didn't file a suit, but I think some lawyer did in Cleveland, alleging discrimination.

Oftentimes, communities of color (especially in places where there's high rates of residential segregation, which I believe is the case historically in Boston) are getting lousy speeds. That could be a business decision because there's not much return on investing in services for low-income neighborhoods because you don't get a lot of subscriptions.

If you have a reliable speed metric, city officials have a way to argue a case against carriers.

Is there any **methodological approach to find patterns of discrimination** in broadband access?

Speed tests that are in the public domain, are good enough to get to the neighborhood-by-neighborhood level.

The [FCC collects providers' speeds through Form 477](#), which is the name of the form that carriers fill to inform their speeds. The trouble is that's advertised speeds. Speed test them depends on enough people in neighborhoods taking the speed tests, so that from a statistical perspective, enough sample in a neighborhood could help determine whether that's a one-off result or a meaningful difference in that neighborhood.

So that's a real challenge. The other ways to do it are going to be awfully expensive for anybody trying to do this, which is to install monitors in people's households.

His opinion about **sampling only 13 households in Cambridge for measuring speed rates** (and just 24 households in Boston).

It depends on how they're measuring speed when they go to households. For example: if you did 24 neighborhoods in Baltimore and chose my neighborhood and measure my internet (which is the highest tier from Comcast), you're going to get a pretty high number in my neighborhood even if my neighbor has a lower speed option, because that's your preference.

I'd wonder why 13 samples in Cambridge. Particularly when you have all the MIT folks, who would say, well, that's wrong. I doubt it's a completely bad approach, but it just depends on what the details are of how they're measuring.

Does the Benton Institute **provide advice as to how to use the new federal money?**

We don't provide advice. People will put out information, they write articles that usually come out on Friday that will serve as a guide to what's going on with funding opportunities.

The entity that comes to mind that provides advice is the [National Digital Inclusion Alliance](#), which is an advocacy group promoting digital inclusion. And I do think they will provide advice to cities who ask for it on how to take advantage of funding opportunities.

Who are the
**people to talk to
in order to
promote digital
equity?**

The National Digital Inclusion Alliance would be a great place to start. See for [Amy Huffman](#), I think would be the person to connect with.

I hear from talking to people that a lot of consultancies are getting into this space because a lot of money is coming into this space. Perhaps some of these consultants have not ever really gotten into this issue but are trying to get into it and are probably overselling what they're capable of doing.

But the National Digital Inclusion Alliance is very good. The Pew Charitable Trusts has its broadband Research Initiative, which focuses on providing technical advice to states on how to address infrastructure and affordability issues. And [Kathryn de Wit at the Pew Charitable Trusts](#) is a person to consider contacting.

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6. Expert Interview: National Digital Inclusion Alliance

Background

As part of the Boston Human Rights Commission’s research project on digital equity, [Amy Huffman](#) was interviewed on November 18th, 2021. Amy is [NDIA](#)’s Policy Director. She is an expert on digital inclusion. Before joining NDIA, Amy served as the State of North Carolina’s first digital inclusion and policy manager for the Broadband Infrastructure Office.

Summary of Interview Key Points

How to **identify and document patterns of discrimination** in broadband access and reliability?

What NDIA did in the [redlining lawsuit in Cleveland](#) (a discrimination suit against AT&T) to identify and document discrimination was, I think, a combination of federally available data, so from the [FCC Form 477](#), and then getting on-the-ground data through surveys plus speed tests.

NDIA researched Cleveland because [Bill Callahan](#), who was the previous research and policy director for us, lived in Cleveland and thus was able to walk around the streets and hone into that data. So, having that local on-the-ground perspective was super important.

[M Lab](#) conducts speed tests. They partner with cities, states, and counties to help get that data.

How to **sample in a representative way** in measuring broadband access and reliability?

We cannot make generalizations based on a small survey sample. By looking at one household, you can't start making predictions about its neighboring households.

You need specific data per household on who's connected and who's not. And then intersect such information with demographics for which the American Community Surveys is a good data source.

Are there **US cities that have achieved digital equity?**

No one has achieved digital equity. Digital equity would mean that every resident in that city or state, or county has equitable access to all the technologies, skills, and internet that they need to thrive.

But some places are further along than others. Some good examples are:

- The [City of Charlotte](#) (Mecklenburg County in North Carolina);
- [Franklin County, in Ohio](#) (where there is a coalition that is working towards this);
- [Seattle, Washington](#) (they have been working on these issues for a long time);
- [San Antonio, Texas](#) (there is a pretty robust coalition).

Are there places where providers have given **free broadband access to public housing residents or senior residents?**

Nowhere that I am aware of. But there are “gap networks” or “mesh networks” owned by communities. These networks are common in areas that service providers do not cover because of their low-income level or remoteness. I’ve seen such networks happen in public housing and poor communities.

The City of Detroit, MI, is doing great work around this through the [Detroit Digital Justice Coalition](#).

What is the **best approach for closing the digital gap?**

There is no silver bullet, so there is not going to be one policy. It is going to be a mix of different approaches. For example:

- The city needs to prioritize digital inclusion and digital equity. So, it has to put money towards it, put staff towards it, and create some goals for the city.
- The city’s digital equity efforts must be holistic and comprehensive. That is, the city must look at their current city regulations and see which of those regulations may be inhibiting digital equity, and then look at what’s missing. Policies might look different in every city due to different state rules.
- Ensure that the city has multiple providers in every area. Anytime there are fewer than three service providers, that’s a lack of competition, it makes the prices high.
- Make sure that the providers in your city are being good stewards and working on behalf of the community, not just for their



bottom line. And thus, offer discounted rates to consumers and are held accountable by the communities.

- The secret sauce to achieving digital equity it's people from the community coming and working together. There needs to be a space for people working on digital inclusion in the city of Boston to coalesce, align, and work together to serve the residents. One organization may be getting computers to folks, and another is great at helping folks get the skills they need. Often, you're not going to find all of those things in one organization.

How could **federal funds help reach out underserved communities** with high-speed internet?

The [Emergency Broadband Benefit Program](#) just stood up under the American Rescue Plan Act to provide \$15 USD a month for low-income households for their internet service. However, it does not require that internet service providers participate. Their participation is optional. Hence, cities could invite them to participate in this program.

Further, other provisions in the Infrastructure Bill Act encourage providers to offer quality low-cost offers to low-income consumers. The details of this will be up to the states. So it has not been decided yet.

Is the **current standard speed rate of 25Mbps enough** for meeting the needs of a household?

There has been a national conversation about this, mainly related to all the federal funding available. The policies that were put into place by the Infrastructure Act are meant to encourage speed increases specifically.

The [Infrastructure Act](#) defines “unserved” as areas without 25Mbps broadband and “underserved” as areas without 100Mbps.

And then, other federal funding from the recovery grants, specifically the [Capital Projects Fund](#) (which is in the American Rescue Plan Act), has a preference for fiber and future proof networks with high bandwidth.

Is the NDIA providing **advice on how to use the** (currently available) **federal money**?

We can play that role. But we do highly believe in equipping local folks to do that as well.

NDIA is a national organization that supports local organizations. Therefore, people who live in Boston should be the ones advancing decisions on how to use federal funds.



Which **partnerships** could the Boston Human Rights Commission seek to promote digital equity?

Closing the digital gap requires an intersectional and cross-departmental approach. The most important thing is engaging Boston's people and ensuring all decisions consider their voices as critical inputs.

Also, forming partnerships across the board is pivotal. That is, to work together with city government, county government, anyone working in housing, community development, economic development, health, public health, and education. All these folks should be working together to close the digital divide in their various realms because it impacts education a bit differently than in health care.

Partnering with community-based organizations is super important. So Boston's nonprofits or community anchor institutions, as libraries and schools.

7. Expert Interview: Pew Charitable Trusts

Background

As part of the Boston Human Rights Commission’s research project on digital equity, [Anna Read](#) was interviewed on November 30th, 2021. Anna is Senior Officer of the Pew Trusts’ [Broadband Access Initiative](#). She is an expert on broadband planning. Before joining Pew Trusts, she worked as a project manager on regional broadband planning efforts for Missouri’s Office of Administration and the International City/County Management Association. Her work focused on smart growth and rural communities.

Summary of Interview Key Points

Are there **US cities that have achieved digital equity?**

No one has achieved digital equity. Most state programs have focused on infrastructure deployment, particularly in rural and unserved areas, and have been less focused on adoption and affordability issues.

California is the only state that had any money going towards adoption and affordability efforts. Even when it has not achieved digital equity, the [California Emerging Technology Fund](#) has helped make significant progress towards its digital equity goals.

California has another fund focused on public housing. It primarily funds things like digital navigator programs that help connect people to device programs and low-cost offers offered by Internet service providers. It has also focused on line extensions, which mean extensions of the last little bit of infrastructure up to low and moderate-income households (where usually the homeowner or the property owner would have to pay to connect the home).

<p>Are there places where providers have given free broadband access to public housing residents or senior residents?</p>	<p>Yes, there are examples of that. While broadband is free for the residents, someone pays the costs.</p> <p>So, for example, with the Coronavirus Relief Fund money, the City of Chicago connected households through a T-Mobile hotspot and school districts through philanthropic dollars going forward for paying the costs of that connection.</p> <p>The State of Virginia, for example, funded a couple of mesh wireless networks in low-income neighborhoods with their Coronavirus Relief Fund to provide free access for residents.</p>
<p>How could digital inequity (access and speed) be documented locally?</p>	<p>Because the granularity of the adoption data from the American Community Survey data is somewhat limited, you need to collect your data or draw data from several sources.</p> <p>For example, a recent study at the University of Florida looks at the concept of digital redlining. Particularly, it examines the lack of investment by Internet Service Providers in low-income neighborhoods by analyzing the overlap between that disinvestment and historical residential patterns.</p>
<p>What is the best approach for closing the digital gap?</p>	<p>At the state level, providing funding support to entities engaging in closing the digital gap is essential.</p> <p>In the case of the California Emerging Technology Fund, a critical success factor was ensuring that trusted entities conduct outreach, for example, schools or other community partners—people with whom there's a lot of interaction and trust. The support must be available in multiple languages as well. It is crucial to walk people through the process because, particularly when you're accessing some of these low-cost offers or the federal benefits, the enrollment processes can be complicated.</p> <p>Another important aspect that the Chicago Public Schools example taught is the importance of providing multiple points of contact with families.</p> <p>These are key ingredients of the sauce: the outreach and the multiple points of contact with all the stakeholders.</p>

Are the so-called “mesh networks” reliable and effective for closing the digital gap?

There are a couple of things there. First, there's not a great definition of what reliable service means: How much of that is based on speed, network downtime, or speed and congestion. So I think that's a little bit of a challenge.

And then there does not seem to be much good research on the sort of long-term viability of wireless mesh networks.

These types of networks do depend on having a pretty solid wired connection. So, they are effective in neighborhoods with reasonably strong wired infrastructure, but you maybe have pockets of under-connected households.

How could state regulations impede or facilitate digital equity?

States, on paper, don't regulate broadband. Several states have adopted legislative language that says the state has no regulatory authority over broadband service.

For example, New York, this past year, attempted to pass a requirement that any provider or offering service in the state has a \$15 a month low-cost offer for low-income families, and because of that, [providers sued the state](#).

However, depending on the state, there are things like cable franchise agreements. They are in negotiation and agreement between the community, the state, and internet service providers. So, they can include requirements related to both parties. Hence, they can be used to further support deployment or network upgrades in low-cost, low-income, and underserved neighborhoods (for example, see the [case of California](#)).

How do throttling practices affect digital equity? How could they be overcome?

The State of California has built a kind of a gold standard on overcoming throttling practices by enacting net neutrality legislation. Washington State gets cited as the second.

Some states do not have a statewide requirement for that but require that any provider receiving grant funds abide by net neutrality practices (for example, Maine and Colorado).

Avoiding data throttling and ensuring non-discrimination are key components for promoting free and open access to what users are consuming on the internet.



There is a fairly well-established [body of research](#) at this point that emphasizes that net neutrality provisions do not hinder internet service providers' investments in their networks.

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8. Strategies for Realizing Human Rights across the Mayor of Boston’s Digital Equity Plan

Background

The [Digital Equity Plan](#) of the new Mayor of Boston comprises five parts: (1) Deliver technology for education and economic opportunity; (2) Promote digital justice in city services; (3) Secure health equity through technology; (4) Leverage transit for mobility and connectivity; and (5) Harness leadership for broader change.

The following table highlights three strategies within such a plan, which are relevant for advancing human rights in the City. The table analyzes their impacts and proposes ways toward their prompt implementation.

Mayor’s Digital Equity Plan	Impact for Human Rights & Proposals for Implementation
<p>(1) Deliver technology for education and economic opportunity</p> <ul style="list-style-type: none"> Prioritizing ongoing communication about digital equity issues with residents across each neighborhood, and coordinate with non-profit organizations and city departments, such as the Department of Innovation and Technology, to create timely, targeted, and effective strategies to address challenges that arise. 	<p>According to the National Digital Inclusion Alliance (NDIA), the most effective partnerships in advancing digital equity in the US have been those who (a) include actors from across the board (residents, local nonprofits, authorities, and providers), and importantly, (b) have a space to get together, coalesce, align, and work to serve the residents.</p> <p>This has been done through the formal creation of digital equity coalitions endorsed by local governments. Such coalitions adopt principles and commit to innovative projects. For example: Detroit Digital Justice Coalition and Franklin County Digital Equity Coalition have advanced broadband access through mesh networks in several underserved areas of such cities.</p> <p>By creating such a coalition in Boston, the city will not only ensure timely and effective communication and coordination between residents, nonprofits, and City Hall, but it will accelerate and harness the potential of collective learning and action. Crucially, the collective power of a coalition could help reduce current asymmetries between residents and big internet service providers. It can encourage good stewardship among Boston’s service providers by facilitating a permanent dialogue between them and the needs of local communities.</p> <p>Proposal: To create Boston’s Digital Equity and Human Rights Coalition, adopt and launch its Principles and Plan.</p>

(2) Promote digital justice in city services

- Creating a community-driven Technology Ethics Committee within the Commission on Human Rights to ensure that procurement and use of technology for City services meets a code of ethical standards drafted in partnership with community;

The ethical issues associated with the use of technology are emerging and dynamic. Users are increasingly raising concerns regarding data privacy and confidentiality, integrity and inclusion of digital communications and services, and net neutrality, all of which [touch upon several human rights aspects](#).

[Ethics oversight committees](#) are gaining prominence worldwide (for example: [UNESCO's](#) and [Google's](#)) as a way to minimize and manage such digital risks. Their mandate is to formulate ethical principles that could provide decision-makers with criteria that extend beyond purely economic considerations thereby promoting responsible use of digital technologies.

A [well-designed committee](#): (1) brings together people with the range of expertise needed to effectively analyze and respond to complex problems; (2) is responsive to rapid advances in technological capabilities; (3) develops standards, precedence, and resources to be used in decision-making processes; and (4) constitutes a repository for institutional knowledge.

Proposal: To create a Technology Ethics Committee to ensure that the procurement and use of digital technologies respect people's rights.

(4) Leverage transit for mobility and connectivity

- Deploying City resources to install free, secure public WiFi at bus stops and along bus routes most heavily utilized by BPS students and community members who rely on smartphone data plans as their primary source of Internet access;
- Working with the MBTA to harness federal and state stimulus funds to extend free, reliable WiFi to MBTA subway

Several US cities have begun to provide free Wi-Fi in bus stops and subway stations as a way to help bridge the digital gap. By allowing millions of commuters to save data from their monthly broadband service package, this strategy has been successful in keeping public transport users digitally connected.

The [MBTA serves over 1 million daily riders](#), which include residents from across the Greater Boston region. This implies that the free provision of Wi-Fi in Boston's MBTA subway stations will benefit not only residents, but also non-residents who work in the city.

[Chicago, IL](#) became in 2019 the first US city to provide 4G wireless service in its subway stations. [Minneapolis, MN](#) offers residents and visitors free broadband from 117 hotspots throughout the city.

Relevant for this particular strategy is the possibility of replicating the subway stations' and bus stops' Wi-Fi signals to nearby neighborhoods. This could optimize investments by expanding their outreach to underserved communities beyond public transport users. For example, in [Turney, Missouri](#), the installation of low-cost devices near an open-source Wi-Fi enables communities to replicate the signal and have internet access.



stations, with priority for major hubs serving residents of color and low-income communities.

Proposal: To identify underserved areas near bus stops and MBTA subway stations (in which free Wi-Fi is to be installed) and analyze whether low-cost mesh networks could replicate and therefore expand such Wi-Fi signals towards these communities.

Annex I: Broadband Glossary

BANDWIDTH

In the world of internet service, bandwidth has come to mean the speed of internet service, measured in bits per second.

BIT

A single unit of data, either a one or a zero. In the world of broadband, bits are used to refer to the amount of transmitted data. A kilobit (Kb) is approximately 1,000 bits. A megabit (Mb) is approximately 1,000,000 bits.

BROADBAND

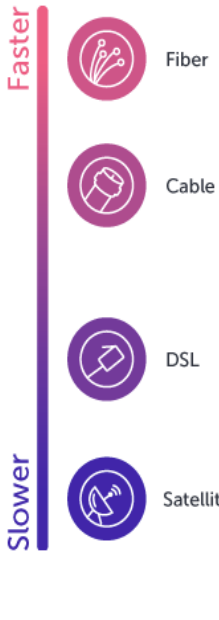
A descriptive term for evolving digital technologies that provide consumers a signal switched facility offering integrated access to voice, high-speed data service, video-demand services, and interactive delivery services (e.g. DSL, Cable internet).

BROADBAND (TECHNOLOGY TYPES)

The different types of materials over which data travels.²

- *Fiber*: A fiber optic cable is made up of bundles of hair-thin strands of very pure glass or plastic. Data passes over them in the form of light pulses created by lasers. Because of the purity of the glass or plastic, data can travel much farther and faster on fiber than on cable or DSL technologies.

² Rebecca Lee Armstrong and John Dille, "The Consumers Guide to Internet Speed," *HighSpeedInternet*, March 23, 2021, <https://www.highspeedinternet.com/resources/the-consumers-guide-to-internet-speed>.

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- **Cable/Coax:** The common terms for cable internet access, which uses the cable TV infrastructure to provide internet access services. Coax is the short term for coaxial cable, the type of cable used in cable TV infrastructure.
 - **DSL:** Digital Subscriber Line. A group of technologies used to transmit data over telephone lines. It is currently the most common technology for broadband access in the world.
 - **Satellite:** Internet service provided via satellite. Satellite can be the only option for remote residents, but it is generally considered slow, less reliable and more expensive than other options if and when they are available.
 - **Wireless:** A short name for fixed wireless (as opposed to mobile wireless). Fixed wireless technology transmits data between two fixed antennas using radio waves, including microwaves. Unlike Wi-Fi, the radio beams are often kept narrow to keep up the strength of the signal. Antennas are preferably set up high on buildings since line of sight is necessary.

BROADBAND (SPEED RATES)

The speed of internet is measured based on the service’s *download* and *upload* capacities in Megabytes (1 million bits) per second (Mbps). Download speed enables data to move from the service provider to the end user, while upload speed moves data from the end user’s computer or device to the service provider.

- **Standard speed rate.** Under the current FCC policy, created in 2015, *25 Mbps down/3 Mbps up* is the minimum standard for broadband. However, those speeds are no longer enough to meet the needs of households, particularly when all family members are working and attending school remotely.³ A 100 Mbps down/100 Mbps up is seen as a more adequate standard.

³ On March 2021, Senators asked the FCC to change the minimum speed rate benchmark. Please, see Karissa Bell, “Senators ask the FCC to change the definition of high-speed broadband,” *Engadget*, March 4, 2021, https://www.engadget.com/senators-fcc-change-definition-high-speed-broadband-222150947.html?guccounter=1&guce_referrer=aHR0cHM6Ly93d3cuZ29vZ2xlLmNvbS8&guce_referrer_sig=AQAAANAN9aXtPrLMoC9I6dG231dFsIMdkvw_uX0nVpRzTK8_R9wDWMQ5N61ooXh4-dIXCBxxNrO9OfGh3PYI8lBityiZw4K4lOci8kDYkc_4q2j1LO4pgOHUsD81orvW2shQGM3sCsEJ_YmhldRxe9HBvW6q3S3M6orKP7w1aQiklt8

DIGITAL DIVIDE

The gap between those who have access to and can effectively use information technologies and those who cannot.⁴ The concept has been further refined to include differences in access due to the availability of internet and the knowledge, skills, and abilities to deploy it. Therefore, the concept has been narrowed down to two tiers:

- *First-level digital divide*: It refers to the divergence of PC, laptop or tablet ownership (ownership of digital devices that enable online navigation) and broadband access.
- *Second-level digital divide*: It denotes the inequality of knowledge, skills, and abilities necessary to use information technologies.

DIGITAL EQUITY

The right of everyone to use information technologies, including access to digital devices, quality, free and neutral broadband and knowledge, without distinction, exclusion, restriction, or preference based on gender, race, ethnicity, national origin, age, sexual orientation, occupation, economic status or any other sociodemographic factor.

THROTTLING

Bandwidth throttling is the intentional slowing or speeding of an internet service by an internet service provider. Throttling can be used to actively limit a user's upload and download speed rates and even out the usage of the total bandwidth supplied across all users on the network.

⁴ Jayajit Chakraborty and M. Martin Bosman, "Measuring the Digital Divide in the United States: Race, Income, and Personal Computer Ownership," *Professional Geographer* 57, no. 3 (2008): 395, <https://doi.org/10.1111/j.0033-0124.2005.00486.x>