

WINTER 2020/2021

2020 Impact Report

NYC Mayor's Office of the
Chief Technology Officer

nyc.gov/cto

Message from the CTO

2020 was an unforgettable year, with New Yorkers enduring unprecedented hardships yet rallying with inspiring resilience and solidarity. The sound we all made hanging out of our windows at 7pm to cheer on healthcare workers is something I'll never forget. As trying as the year was, I found myself thankful to be in a position – alongside so many dedicated public servants – to do something, anything, to help.

That's the thing about technology – when done right, it's the helper, not the hero.

The Mayor's Office of the Chief Technology Officer, which includes researchers, program managers, product managers, web developers, data scientists, designers, and experts on AI and the Internet of Things, is collectively known as "NYC CTO," and we often partner with peers in other City agencies, mission-driven non-profits, universities, and even tech startups in the private sector. We started the year focused on how technology could make the City better equipped to meet the future and that focus became even more valuable to the City as the future was essentially pulled forward, leading to perhaps ten years of digital transformation sweeping over society in just ten months.

This *2020 Impact Report* contains highlights of remarkable achievements from a remarkable year, and it is by no means exhaustive. From publishing the Internet Master Plan – hailed as one of the nation's most visionary and comprehensive blueprints for universal broadband – to distributing over 10,000 internet-connected tablets for older adults, we made significant contributions to closing the digital divide in New York City. During the peak of the COVID-19 crisis in the spring, we worked with City Hall, agency partners, and the non-profit U.S. Digital Response to secure critical PPE and create

digital dashboards to track these essential resources across more than a dozen agencies. Our suite of "NYC[x]" innovation initiatives expanded capabilities around Moonshot and Co-Labs challenges and added the brand-new Digital Service and an award-winning Innovation Fellows program, successfully recruiting expert technologists to serve "tours of duty" in government at a time when they were needed most.

These are just a few of the achievements from our team in 2020. Please peruse this *2020 Impact Report* to get a better feel for the work we have done. If you have questions, you are always welcome to reach out at cto@cto.nyc.gov.

On behalf of the entire NYC CTO team, I can say that we're proud of what we've accomplished for New Yorkers in an especially challenging year. Of course, we recognize that those challenges do not simply disappear with the changing calendar and we look forward to continuing to serve our fellow New Yorkers in 2021.

Sincerely,



John Paul Farmer

*Chief Technology Officer,
The City of New York*

Our focus

NYC CTO aims to ensure that technology is inclusive, accessible, human-centered, and works for all New Yorkers.

Our work is organized around four pillars:



Universal Broadband

Ensuring high-quality, affordable internet for all New Yorkers



Digital Services

Delivering public services online to make government work better for everyone



Inclusive Innovation

Making New York City the place where new ideas are creatively applied to improve lives



Emerging Tech & Society

Advancing technologies, laws, rules, and plans that promote the public good and protect New Yorkers' digital rights

Our team

Our diverse team of engineers, developers, policy makers, researchers, designers, innovators, and tinkerers does transformational work that improves the lives of millions.

Shown below is the team as of the end of the year, but the following former teammates also made important contributions to the work of the office during 2020:

Ayesha Issadeen, Josh Breitbart, Kathleen Clark, Saron Yitbarek.

We also want to thank the fellows, interns, and volunteers who joined our team at various points during this challenging year.



Aaron Meyerson
Deputy CTO for Broadband



Alexis Wichowski
Deputy CTO for Innovation



Amie Dorman
Director of Broadband Operations



Anthony Sanford
Broadband Adoption Coordinator



John Paul Farmer
Chief Technology Officer



Justin Isaf Man
Associate CTO for Digital Services



Kate Hohman
Director of Future Planning & Research



Katherine Benjamin
Deputy CTO for Digital Services



Chad Wilson
Data Analyst



David Reid
Telecom Manager



Devin Felton
Project Manager



Donna Clohessy
Executive Administrator



Mayo Nissen
Design Lab Director



Melissa Quirk
Director, Policy & IGA; Acting Chief of Staff



Neal Parikh
Director of AI



Oscar Romero
Program Director, Innovation



Elyse Voegeli
UX Researcher & Designer



Gary Johnson
Associate CTO for Inclusive Innovation



James Manfre
Broadband Asset Coordinator



Jen Noborikawa
Senior Innovation Advisor & Acting Director of Moonshots



Paul Rothman
Director, IoT + Smart Cities Lab



Priya Shrinivasan
Director of Policy, Standards & Legal Affairs



Rapi Castillo
Lead Developer



Shanna Crumley
Innovation Advisor

Making New York City Future-Ready

Throughout 2020, NYC CTO has designed long-term plans to ensure continued progress in areas such as digital equity and connected systems.



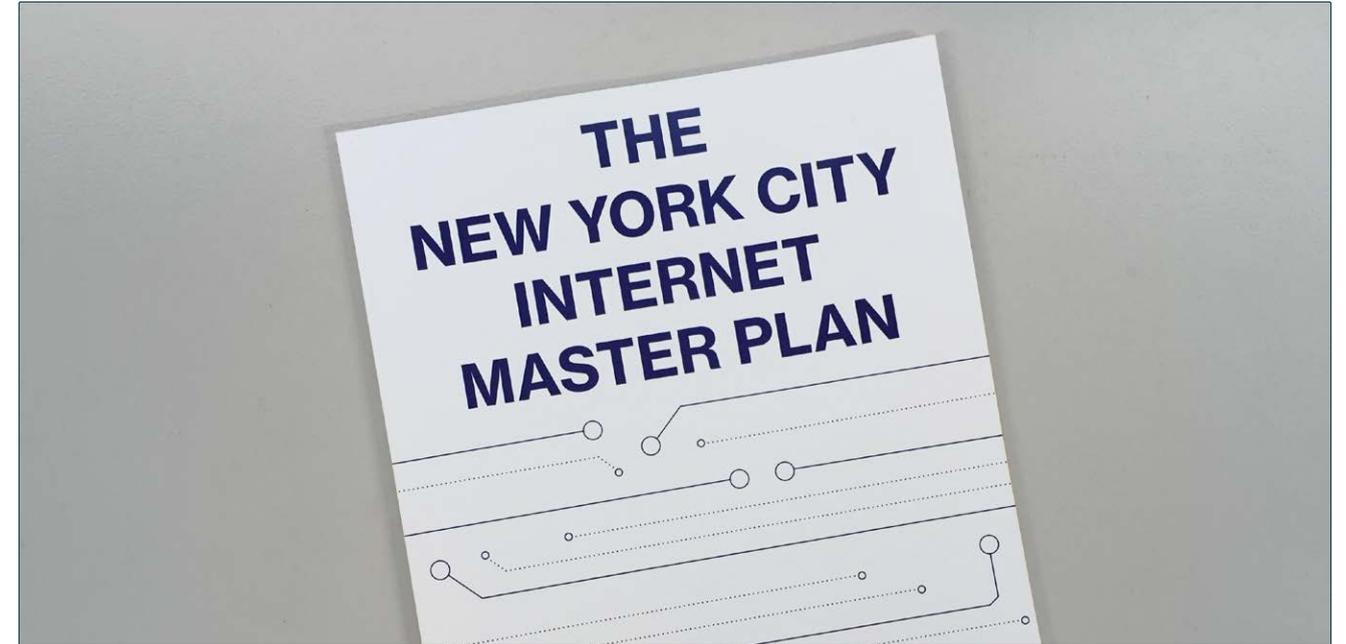
[PHOTO ►] Edwin J Torres/Mayoral Photography Office

NYC Internet Master Plan

The country's first Master Plan for universal broadband

The Internet Master Plan frames the City's goals for the next generation of internet technology, identifies the partnerships and infrastructure required and sets a course for closing the digital divide in New York City.

nyc.gov/assets/cto/#/project/internet-master-plan



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New York City continues to lead the way in building a tech-based economy that works for everyone. The Internet Master Plan demonstrates NYC is prepared to compete with anyone anywhere and is committed to solidifying its position as a globally recognized technology and innovation leader.

ANEESH CHOPRA

1ST CHIEF TECHNOLOGY OFFICER OF THE UNITED STATES

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[The NYC Internet Master Plan] underscores the wisdom of a city that knows the critical value of infrastructure to the quality of life within its borders.

VINT CERF

CHIEF INTERNET EVANGELIST AT GOOGLE AND
“FATHER OF THE INTERNET”

NYC IoT Strategy

For a healthy, cross-sector IoT ecosystem

In follow up to the Mayor's OneNYC 2050 Plan, the New York City Internet of Things (IoT) Strategy describes the key steps to support a healthy, cross-sector IoT ecosystem in the Big Apple. From fostering innovation and cross-sector partnership to new measures to support robust governance and coordination, the NYC IoT Strategy establishes the path toward a connected city that is productive, responsible, and fair for all New Yorkers.

nyc.gov/assets/cto/#/project/iot-strategy



COVID-19 Crisis Response

In March 2020, the COVID-19 pandemic abruptly altered the needs of New Yorkers, New York City government agencies, and frontline healthcare workers. NYC CTO was the first government agency to transition to all-remote work, helped other agencies and local small businesses more quickly adopt the tools, methods, and policies for successful remote work, and developed digital tools to ensure that New Yorkers could easily access key information.



[PHOTO ►] Michael Appleton/Mayoral Photography Office

Millions of Masks

Securing N-95 masks for emergency personnel

The COVID-19 outbreak in New York City created an urgent need for massive quantities of Personal Protective Equipment (PPE) for doctors, nurses, and other frontline workers. In partnership with philanthropies and businesses worldwide, NYC CTO successfully secured millions of masks during the initial wave of the outbreak, ensuring that healthcare workers could effectively respond to the pandemic.

PPE Dashboard

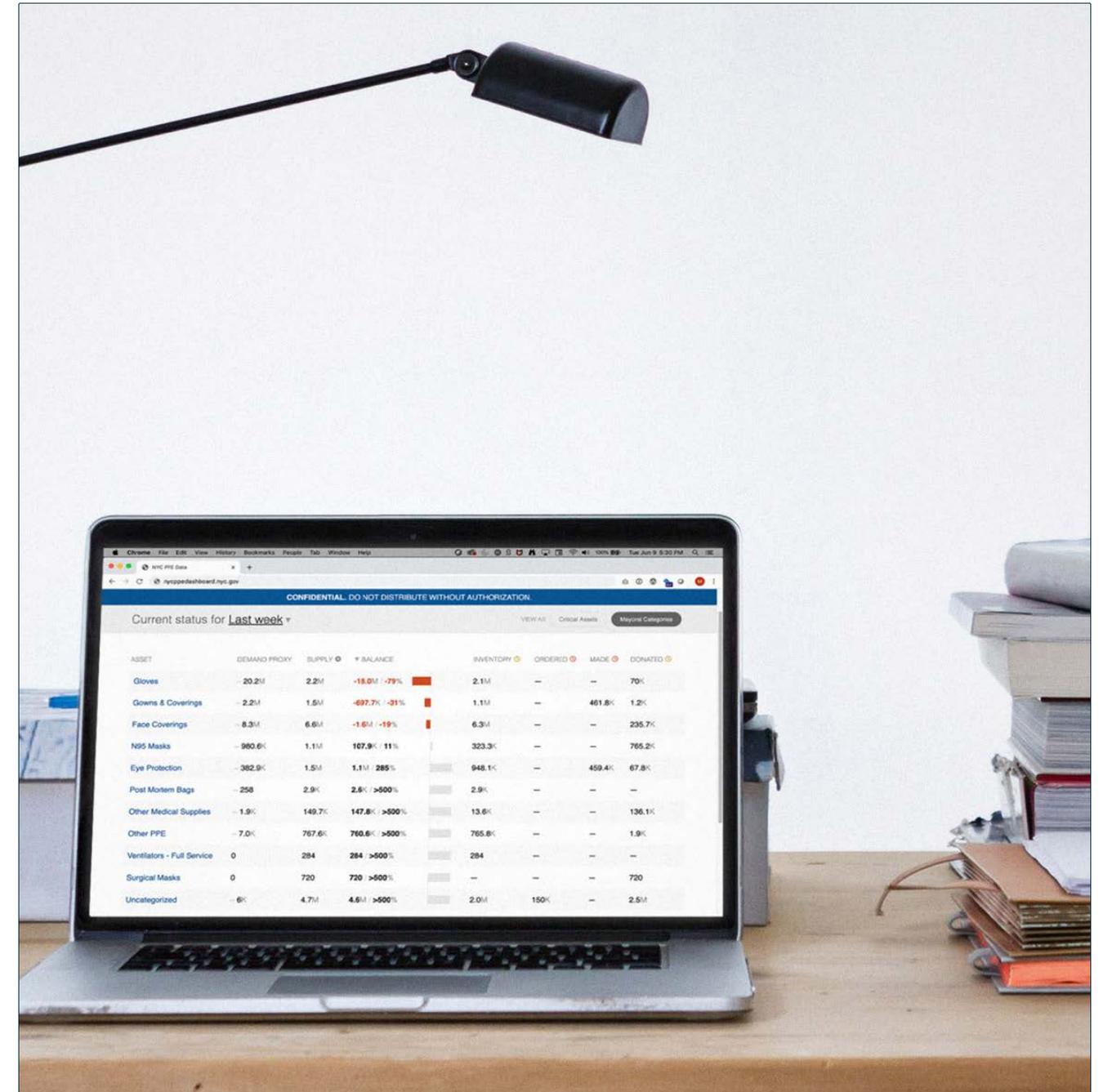
Tracking life-saving supplies in the midst of a crisis

The City of New York partnered with the U. S. Digital Response (USDR) to help City leadership more effectively use data on the status of PPE (Personal Protective Equipment) being produced, donated, or procured to drive smarter decision-making and better resource allocation. The PPE Dashboard identifies and aggregates disparate data sources from multiple agencies into a consolidated view and estimates demand, allowing the City to satisfy time-sensitive needs for PPE.

NYC CTO led the creation and deployment of the PPE Dashboard, including crafting partnerships among 12 stakeholder agencies, using iterative software development, providing demonstrations to key decision-makers, and ensuring the dashboard met cybersecurity standards.

For more information, see

nyc.gov/assets/cto/#/project/ppe-dashboard

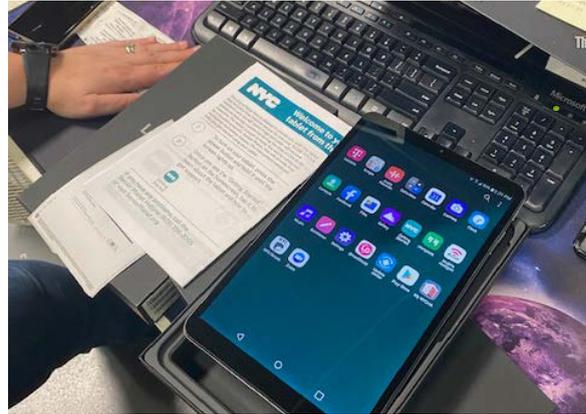


10,000 Tablets

Connecting older New Yorkers

As the pandemic hit New York, the City focused its internet connectivity efforts on vulnerable communities to ensure access to important information and essential services, and the ability to stay connected with family and friends. Recognizing that low-income older adults are more likely to suffer negative health impacts, are in greater need of key resources, and are less likely to have broadband, NYC CTO partnered with the New York City Housing Authority (NYCHA), the Department for the Aging (DFTA), and T-Mobile to provide more than 10,000 internet-connected tablets to older New Yorkers who live in public housing developments. Critically, the new devices were accompanied by custom-built online tutorials, person-to-person telephone coaching, and free online classes from DFTA and the non-profit Older Adult Technology Services (OATS)

For more information, see
nyc.gov/assets/cto/#/project/connected-nycha-older-adults

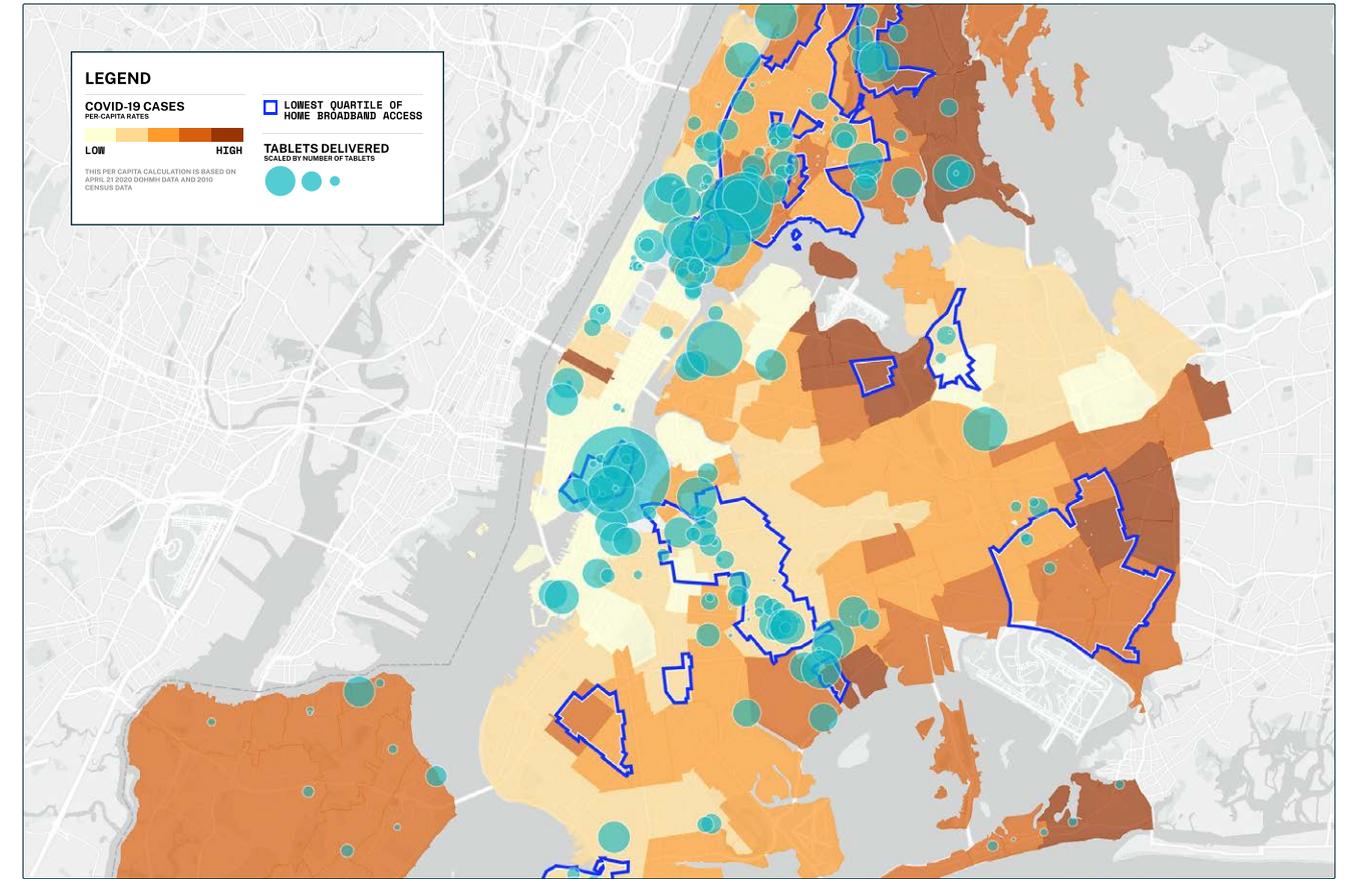


60%

INTERNET ADOPTION RATE IN PRIORITY NEIGHBORHOODS IS 10-20% BELOW THE CITY'S AVERAGE

288

NYCHA DEVELOPMENTS DELIVERED TO, ACROSS ALL 5 BOROUGHES



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When I got the tablet I didn't realize how lonesome I was, without visits from my children. It's like a connection to the outside, without the fear of catching the virus. I was so afraid that if I went outside I'd get sick. The tablet brings you closer to people, without physical contact.

NYCHA RESIDENT & TABLET RECIPIENT

Modernizing Digital Services

As millions of New Yorkers began living, learning, and working from home, demand grew for government services online and trustworthy, easy-to-find information.



[PHOTO ►] John Schnobrich

NYC[x] Digital Service

Instilling digital technology capabilities inside government agencies

The NYC Digital Service was established in 2020, responding immediately to a range of urgent needs raised by the pandemic. After the success of the PPE Dashboard to track existing and projected inventories of lifesaving PPE and medical equipment, the NYC[x] Digital Service, together with volunteers from the non-profit U.S. Digital Response, rolled out an Isolation Hotels Tracker, a logistics coordination tool to support quarantined patients, medical personnel, and others in need of isolated residence. In addition, the team developed a Test & Trace Staffing Prototype, an overview of training progress for onboarding thousands of newly-hired contact tracers. The NYC[x] Digital Service also collaborated with volunteers from the U.S. Digital Response to create the open-source CDC FAQ API, an application programming interface for the Centers for Disease Control's official frequently asked questions in order to facilitate easy access to updates to CDC guidance on the coronavirus pandemic.

NYC[x] Innovation Fellows

Embedding pro-bono tech talent in government

Building on the success of the NYC[x] Digital Service's partnership with the U.S. Digital Response on early COVID response projects, NYC CTO launched the award-winning NYC[x] Innovation Fellows program. The NYC[x] Innovation Fellows program embeds three-to-five-person technologist teams in City agencies to rapidly solve challenges through the use of lean, agile, and user-centered methodologies, which are common in many of the country's leading startups. The first cohort of Innovation Fellows worked through a multi-month sprint to develop three high-priority projects, each resulting in a usable technology product that offered immediate value to partner agencies, and the populations they serve.

The first cohort of Innovation Fellows launched in the summer of 2020, with each team driving forward one of three key projects:

- ELSA (Easy Localization System Access)
- Broadband Asset Map
- Anti Bias Dashboard

The second cohort started in November of 2020, and will be completed in February, 2021. Cohort 2 partners are the Department of Finance, Small Business Services, and the Department for the Aging.



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The innovation fellowship was amazing, and easily one of the most meaningful things I've ever worked on.

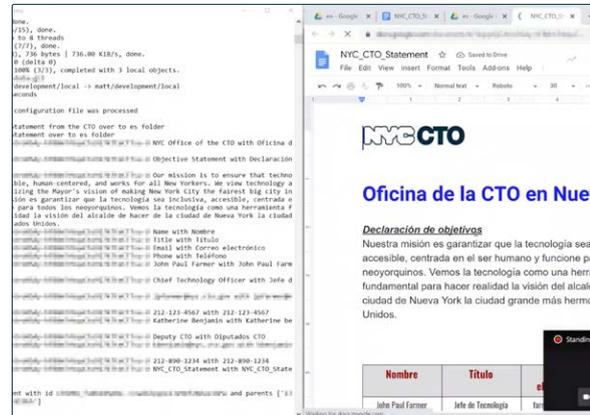
NYC[X] INNOVATION FELLOW, COHORT 1

ELSA

Streamlining the City's digital content translation with an open-source translation pipeline

As City services moved online due to COVID-19, there has been increased need to quickly and cost-effectively translate content for the nearly one million New Yorkers who do not speak English as a first language. ELSA automatically determines the portion of a website's updated content that needs to be translated, uses translation memory to store and reuse previously translated content, and pushes back updated content once it is translated, via either machine translation or human translation. This process will reduce overhead and staff time used for management, and ensure that services and information are available to millions of New Yorkers.

Partner: Mayor's Office of Immigrant Affairs



Anti-Bias Dashboard

Fighting hate crimes by tracking bias and discrimination incidents across New York City

Bias incidents and hate crimes increased dramatically in the early months of the COVID-19 pandemic, in stark contrast to a 30% decrease in other crimes. As public health measures such as mask-wearing became politicized, a wider range of individuals have been victim to bias attacks. The Dashboard helps the City understand the range of hate incidents in order to serve and protect those most at risk.

Partner: Mayor's Office for Criminal Justice



Broadband Asset Map

Driving digital equity by mapping existing and potential broadband service-supporting assets

As the City moves to close the digital divide, agency decision-makers need a means to visualize and track where assets can be deployed, their proximity to existing infrastructure, and context about a neighborhood and its communities. The Broadband Asset Map combines data sets from seventeen agencies to visualize where existing broadband infrastructure is located and the characteristics of both existing and potential assets. The Broadband Asset Map makes it possible to quickly identify where gaps in coverage exist and which types of equipment could be deployed to those areas, thereby enabling the City to steer resources and affordable service to the areas where they are most needed.



For more information on the fellowship, these partnerships, and how to get involved, see

nyc.gov/assets/cto/#/project/nyc-x-innovation-fellows



Accelerating Broadband for All

Too many people lack the combination of home and mobile broadband connections that has become essential. Recognizing the digital redlining and decades-long underinvestment that has led to a yawning digital divide, New York City has chosen to lead the way with widely-praised, pioneering efforts to promote digital equity.

[PHOTO ►] Mika Baumeister



Queensbridge Connected

Extending free broadband for North America's largest public housing development

In April, NYC CTO extended the nationally recognized Queensbridge Connected program for three more years. Launched in 2016, the initiative has demonstrated that internet adoption rates for public housing residents can be on par with rates of the highest-income neighborhoods in the City if cost is removed as a barrier. Queensbridge Connected brings free, high-speed broadband to the 7,000 residents of NYCHA's Queensbridge Houses, the largest public housing development in North America. In addition, the program offers on-site technical support, a community computer center for seniors, and a tech lab operated by the Queens Public Library, which provides a wide range of digital skills training to the community.

For more information, see

nyc.gov/assets/cto/#/project/queensbridge-connected



Rapid Response for NYCHA

Quickly connecting those most in need

NYC CTO released a Request for Expressions of Interest: Rapid Response for Connectivity at NYCHA, soliciting ideas to bring new free or reduced-cost service options to public housing communities. The City received thirty responses offering innovative, quick-to-deploy, high-quality, low-cost or free internet service for NYCHA residents, from companies including minority and women-owned businesses and others new to the New York City market.

In July the Mayor announced a historic \$157 million investment in ending digital redlining and providing high-speed internet. This investment will extend new internet service options to hundreds of thousands of underserved New Yorkers, including NYCHA residents in 2021.

For more information, see

nyc.gov/assets/cto/#/project/usb-nycha



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Our mission to deliver affordable, high-quality internet service has never felt more urgent. COVID-19 has further exposed the inequalities in internet access while changing the way New Yorkers work, learn, and live.

MAYOR BILL DE BLASIO



PHOTO ▼ | Benjamin Kanter/Mayoral Photography Office

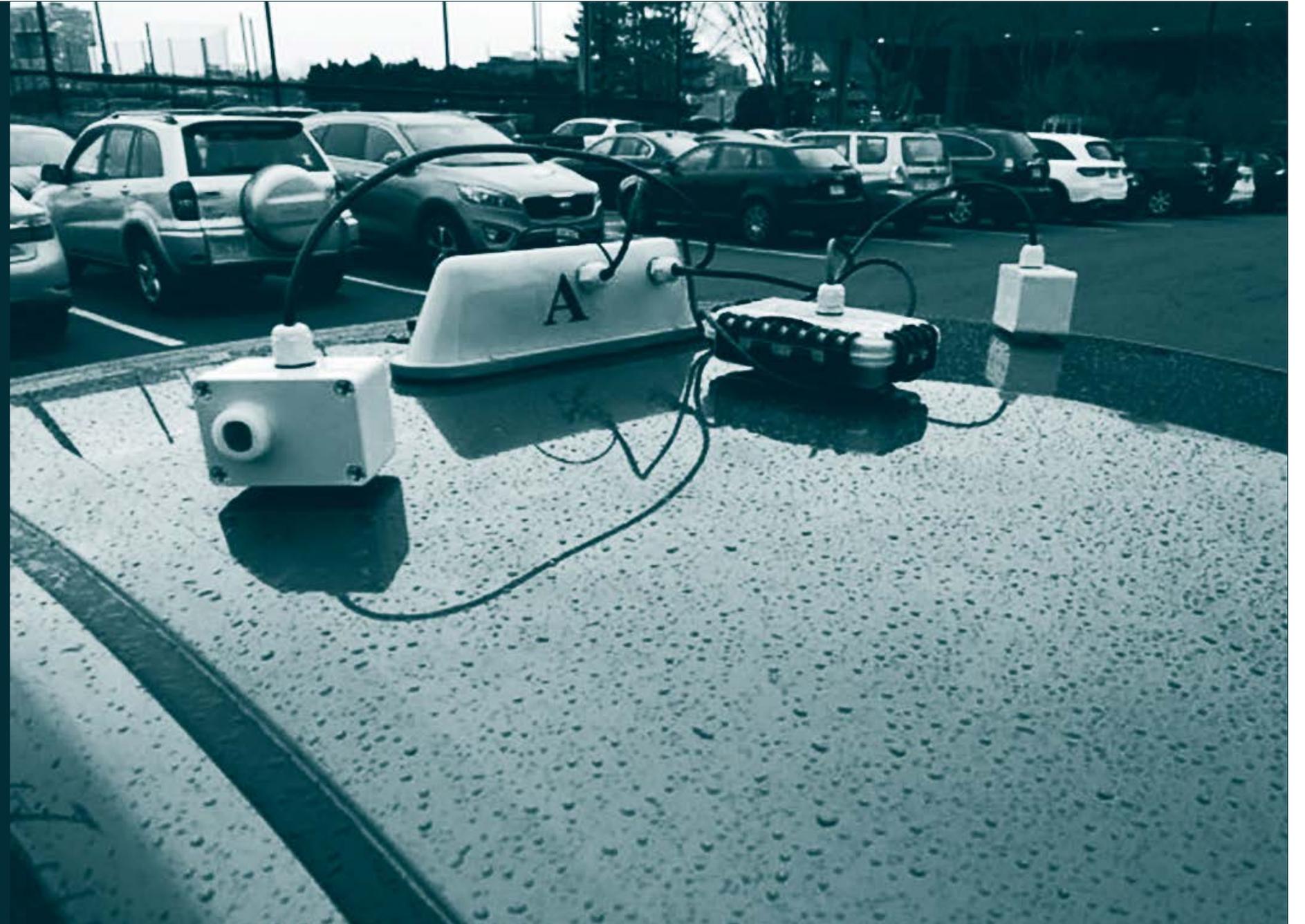
Philanthropic Partnerships

NYC CTO and our partner agencies developed philanthropic partnerships to use technology to improve the lives of New Yorkers.

With support from the Ford Foundation and Mastercard for three new key staffing roles, NYC CTO is increasing the City's capacity to accelerate implementation of the NYC Internet Master Plan. With support from Bank of New York Mellon, youth in Inwood / Washington Heights will be provided with critical STEAM training and job readiness skills. With support from the Rockefeller Foundation, Education SuperHighway, Zoom, and The Information Technology Disaster Relief Center, more students at the City's Learning Bridges sites will have high-performance internet to do their schoolwork.

Piloting Emerging Technologies

New and emerging technologies hold promise for the City to serve people more quickly and efficiently, making life better for New Yorkers, so long as they are tested for safety and effectiveness through the appropriate strategic frameworks, pilots, and measurement and evaluation.



[PHOTO ►] MIT Senseable Cities Lab

City Scanner

Adding environmental sensors to fleet vehicles

NYC CTO worked with the Department of Health and Mental Hygiene, the Department of Citywide Administrative Services, and MIT's Senseable City Lab to launch City Scanner.

Project partners attached solar-powered sensor nodes – capturing data on air quality, temperature, humidity, and road conditions – on the roofs of City vehicles to inexpensively collect more hyper-local data than traditional fixed-position sensors in order to identify areas that have particularly elevated emission levels, known as “hotspots.”

For more information, see

nyc.gov/assets/cto/#/project/city-scanner



FloodNet.NYC

Better resiliency through flood monitoring sensors

NYC CTO partnered with the Mayor's Office of Resiliency (MOR), the City University of New York, and New York University to co-develop a first-of-its-kind, real-time flood monitoring system for parts of Brooklyn and Queens. Funded by a grant from the Empire State Development Corporation, as well as university contributions, the project deploys internet-connected sensors in flood-prone neighborhoods. FloodNet.NYC tests a newly-created software tool for monitoring of flood-related data, the efficacy of the LoRaWAN-based "The Things Network," and new IoT transparency signage developed for the project – all toward potential broader use in City projects.

Rapid IoT

Low-cost, low-risk proof-of-concepts

NYC CTO also collaborated with MOR to deploy a "Rapid IoT" proof-of-concept, aimed at testing scalability of short-term, low-cost Internet of Things deployments, in this case with a focus on resiliency. During a four-week sprint, NYC CTO designed and fabricated sensors and established data communications and a dashboard for monitoring and analyzing incoming temperature data. Based on its success, the Rapid IoT model will be replicated to support low-cost, low-risk, speedy experimentation with IoT technology.



Enhancing Civic Engagement

People are at the core of everything we do. By engaging with a range of communities, collaborating deeply, and keeping an open mind toward innovative approaches, NYC CTO has shown an ability to solve problems faster, better, and cheaper.



[PHOTO >] Ayesha Issadeen

NYC[x] Co-Labs

Co-creating technology solutions to local problems

NYC CTO, the New York City Economic Development Corporation (NYCEDC), the NYC Department of Housing Preservation and Development, and the Mayor's Office to Protect Tenants announced the launch of the NYC[x] Co-Labs Housing Rights Challenge to help the City provide more strategic, targeted, and tailored information to tenants in the Inwood and Washington Heights neighborhood about housing rights, and to enable residents to take protective action.

NYC CTO, NYCEDC and the Mayor's Office of ThriveNYC also released the NYC[x] Co-Labs Accessible Mental Health Challenge to improve mental health among Latinx youth through tools and technologies that improve vulnerable youths' awareness of and access to resources.

For more information, see:

nyc.gov/assets/cto/#/project/inwood-co-lab



Virtual senior centers

Moving connections to digital spaces

Senior centers across the city face a radically changed landscape under the COVID-19 pandemic. As brick-and-mortar locations shuttered to protect public health, center providers were faced with quickly and dramatically shifting program and service delivery models to meet seniors' needs. NYC CTO partnered with the Department for the Aging to launch a design research effort toward supporting senior center virtual programming and service delivery. Via a multi-month engagement, NYC CTO conducted interviews and workshops with City administrators, senior center providers, and older adults across the city to understand the needs of and barriers faced by each stakeholder group, in order to design solutions that address them.

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What would we do without senior centers?
It's incredible.

Now after COVID I got more involved because there are programs online.

RESEARCH PARTICIPANT

NYC[x] Moonshots

Engaging with industry to test bold new approaches

NYC CTO, NYC Cyber Command, and NYCEDC together announced three winners for the NYC[x] Cybersecurity Moonshot Challenge, launched to help the hundreds of thousands of small businesses in the five boroughs improve their data security practices and strengthen New York City as a leading hub for cybersecurity. These three awardees emerged out of 169 applicants from 77 cities in 18 countries on five different continents.

For more information, see

nyc.gov/assets/cto/#/project/cybersecurity-challenge



Neighborhood Challenge

Aiding small businesses hit hard by COVID-19

NYC CTO worked with NYCEDC and the NYC Department of Small Business Services (SBS) to re-launch the Neighborhood Challenge: Tech Forward initiative, an open innovation platform designed to crowdsource solutions to support the city's commercial districts and small storefront businesses that are facing severe impacts due to the COVID-19 pandemic.

Protecting Digital Rights

Fostering a global coalition of cities

Since 2018, when New York City joined Barcelona and Amsterdam to found the Cities Coalition for Digital Rights, a network of 50+ municipalities and multilateral organizations has grown, dedicated to protecting human rights online and in the digital age. NYC CTO took a broad range of actions in 2020 toward advancing these principles for New York City, including influencing policy making, testifying before City Council and State Legislature on key issues, advancing digital rights legislation, working with experts in the field, speaking globally, and convening City agencies to address emerging challenges to digital rights.

For more information, see

nyc.gov/assets/cto/#/project/cities-coalition-for-digital-rights



Global Partnerships

NYC CTO engaged with governments across the world in 2020, advancing its digital rights agenda and exchanging best practices on a wide array of topics – from universal broadband to digital transformation to COVID response.

International engagement topics included:

- Digital exposure notification for COVID-19
- AI ethics and auditing
- Digital government transformation
- Upskilling digital competencies for public servants
- Digital inclusion for older adults
- Digital interventions for COVID-19
- Open source tools
- Universal broadband
- Smart cities
- Digital divide



Timeline

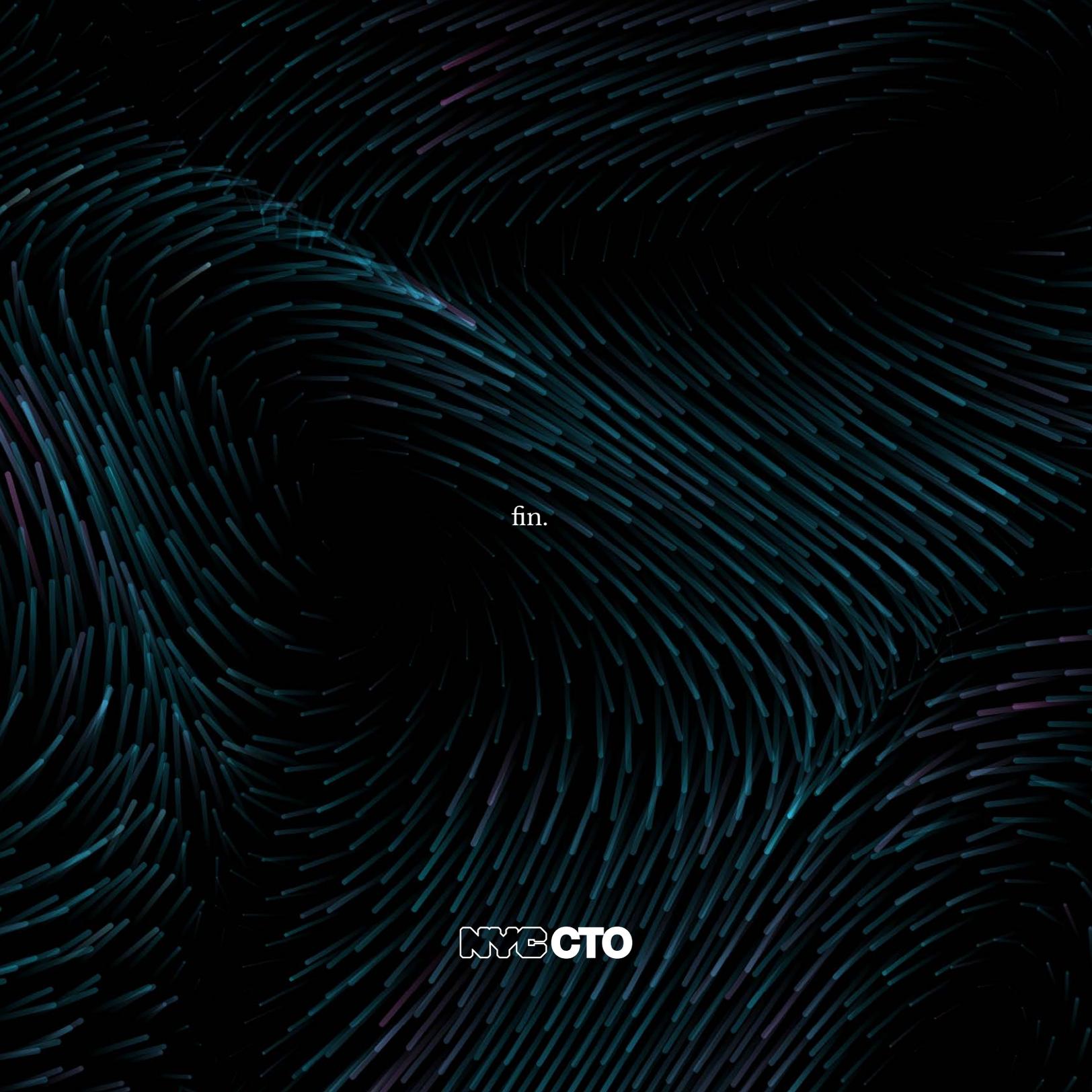
JAN	NYC Internet Master Plan	Released plan hailed as “visionary,” “comprehensive,” and “a game-changer” laying out how New York City will achieve universal broadband
	City Scanner	Launched partnership with MIT to rapidly test air quality sensors affixed to City fleet vehicles
	NYC[x] Co-Labs	Co-created tech solutions with communities in Inwood and Washington Heights for Housing Rights and Mental Health
FEB	Cybersecurity for Small Businesses	Announced winners of NYC[x] Moonshot: Cybersecurity for Small Businesses
	World Urban Forum	At the invitation of UN-HABITAT, emphasized to global audience the importance of protecting digital rights
	Millions of Masks	Successfully secured millions of N-95 and equivalent masks in the first months of the outbreak
MAR	COVID-19 Data Task Force	Advised Department of Health & Mental Hygiene
	Digital Toolkits	Launched Work from Home & Digital Life at Home toolkits
	PPE Dashboard	Working in collaboration with 13 City agencies and in partnership with pro-bono tech volunteers from the U.S. Digital Response, NYC CTO created a PPE Dashboard to track inventories and estimate demand for lifesaving PPE
APR	NYC[x] Digital Service	Launched NYC[x] Digital Service and worked on Isolation Hotels’ user experience design
	Queensbridge Connected	Extended free high-speed internet to the largest housing development in North America for three more years

MAY	Connected NYCHA: Older Adults	Provided 10,000+ internet-connected tablets to older New Yorkers who live in NYCHA developments
JUN	Task Force on Racial Inclusion & Equity	Participated in the Mayor’s newly created Task Force, bringing focus to how digital redlining could be corrected
	Rapid Response RFEI	Issued Request for Expressions of Interest to quickly deploy free or low-cost internet to tens of thousands of NYCHA households
JUL	\$157 million for Internet Infrastructure	The Mayor accelerated the Internet Master Plan, announcing a historic \$157 million investment in ending digital redlining and ensuring affordable, high-speed internet
AUG	NYC[x] Innovation Fellows	Embedded small teams of pro-bono technologists in City agencies to rapidly solve specific challenges through the use of lean, agile, and user-centered methodologies
	Rapid IoT	Collaborated with the Mayor’s Office of Resiliency to test low-cost, low-risk, speedy proof-of-concept sprints with IoT technology
SEP	Older Adults Tech Training	Worked with the Department for the Aging and Older Adult Technology Services (OATS) to roll out Android Essentials and other training for NYCHA seniors
OCT	Financial Times Nomination	FT nominated NYC[x] Innovation Fellows for its Public Sector award
NOV	Hayes Prize for NYC[x] Innovation Fellows	Deputy CTO Katherine Benjamin and the NYC[x] Innovation Fellows won the Frederick O’Reilly Hayes Prize for Coronavirus Crisis Response
	NYC[x] Co-Labs Housing Rights	Announced two winners of the NYC[x] Co-Labs Housing Rights Challenge
DEC	NYC IoT Strategy	Completed New York City’s first-ever strategic roadmap for connected devices and systems
	Philanthropic Partnerships	Finalized partnerships with the Ford Foundation, Mastercard Center for Inclusive Growth, Rockefeller Foundation, and others to address the digital divide



Looking ahead

As we continue our work in 2021, NYC CTO will build on the foundation set and the progress made in 2020. Working collaboratively, we will implement new solutions toward universal broadband, release new emerging technology plans and pilots, drive governance measures to move the City forward, continue to modernize government services and reduce costs, and support a healthy and vibrant tech sector in New York City.

The background is a dark, almost black, circular pattern composed of numerous thin, parallel lines. These lines are primarily teal and light blue, with some lines having a subtle gradient or appearing slightly blurred, creating a sense of depth and movement. The lines are arranged in a way that suggests a large-scale circular or spiral structure, similar to a fingerprint or a microscopic view of a material.

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NYECTO