

Building the Bridge

A REPORT ON THE STATE OF THE DIGITAL DIVIDE IN THE DISTRICT OF COLUMBIA

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Mayor Muriel Bowser
District Chief Technology Officer Tegene Baharu

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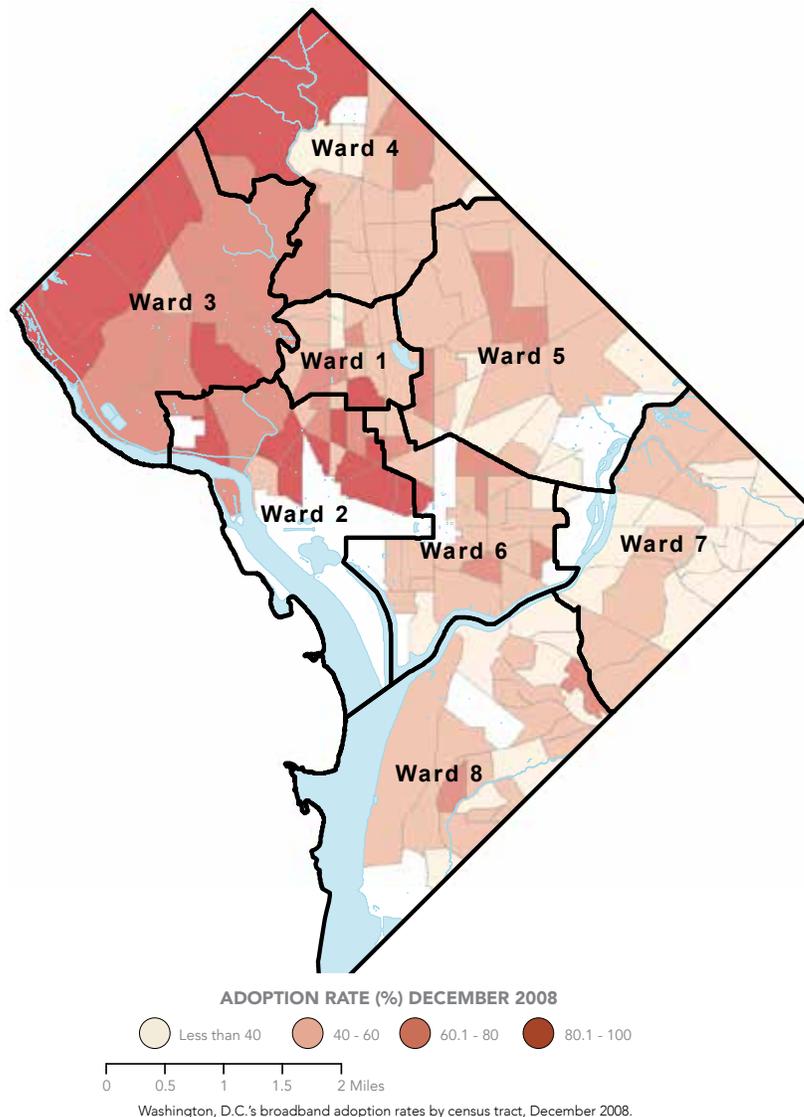
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Executive Summary

Digital technology has changed the way people around the world work, learn, access information and communicate. The Internet can help a person do everything from start a new business to bring attention to an important social cause in another country. The ability to use and access digital technology is a necessity for success in today's world. However, even as more and more people are becoming familiar with digital technology, there are still many residents in the District of Columbia who lack the resources or understanding to fully take advantage of the benefits of Internet access. This digital divide is not new. Research on home wireline broadband adoption rates in 2008 found that 75 percent of residents in Wards 2 and 3 had home broadband

access, while in Wards 5, 7, and 8 fewer than half of all residents had high-speed Internet service at home.

The District of Columbia Office of the Chief Technology Officer (OCTO) recognized this disparity and applied for federal grants to address the growing digital divide in the city. In 2010 the District received more than \$25 million in federal grants from the National Telecommunications and Information Administration's (NTIA) Broadband Technology Opportunities Program (BTOP) to expand the city's digital infrastructure, upgrade public technology access locations, collect broadband data, and encourage digital inclusion through outreach, education, and training.



This report, funded by the State Broadband Initiative grant, describes the state of the digital divide in the District of Columbia and shows the breadth of digital inclusion initiatives in the city. It includes other BTOP-funded government projects as well as nonprofit and community-based technology programs.

The District government's single largest BTOP project was the creation of the DC Community Access Network (DC-CAN), one of the nation's most advanced publically funded and managed broadband projects. In addition to connecting public institutions across the city, DC-CAN provided affordable broadband access for schools, nonprofits, and community anchor institutions in economically disadvantaged areas. This investment in public infrastructure helped the city upgrade Internet service in libraries, recreation centers, and senior centers that later served as digital literacy training sites. The 100 gigabit network also serves as a middle mile provider, offering local telecommunications companies wholesale services so they can provide low-cost broadband to District residents and businesses.

OCTO also used federal funds to create Connect.DC, the District's Digital Inclusion Initiative, to engage the public, private, and nonprofit sectors and community stakeholders in efforts to build digital inclusiveness. Through Connect.DC and its partners, thousands of low-income D.C. residents have received basic to advanced digital training, signed up for affordable broadband Internet services, and received free or discounted refurbished equipment and services.

Nonprofit and community-based organizations have also been important actors in efforts to address digital disparities in the District. These organizations work closely with the residents most likely to be offline and deliver critical services that address their most basic needs. Some nonprofits also provide computer training and integrate technology into their existing health, education, and personal finance programs.

These initiatives have paid real dividends. More than 75 percent of District residents now have high-speed Internet access at home and more than 8,000 District residents have received computer training over the past four years. District residents can also access close to 100 locations across the city for public computer and Internet use. The District's investments in broadband access and training have empowered entrepreneurs to grow their small businesses, equipped unemployed residents with critical job skills, helped children complete research projects for school, and allowed seniors to keep in touch with their loved ones.

Over the past four years, local government, nonprofits, and community stakeholders have collaborated to help District residents, businesses, and community anchor institutions understand the benefits of broadband adoption, build critical digital literacy skills, and gain access to affordable high-speed Internet. While the NTIA grants that supported this work have ended, the District's work continues. Achieving the goal of full digital inclusion will require continued innovation and collaboration to ensure that technology access and use are available to every District resident.

Introduction

Fifteen years ago, having a high-speed Internet connection at home was considered a luxury. Today, having access to a high-speed broadband connection is an absolute necessity. The technological revolution of recent decades has changed the way we communicate, conduct business, learn, and share information. According to the Federal Communication Commission (FCC), the term broadband refers to high-speed Internet access that is always on and faster than traditional dial-up access*.¹ Broadband includes several transmission technologies such as fiber, wireless, satellite, cable modem, digital subscriber line (DSL), and broadband over powerlines.²

The expansion of broadband in the United States can be largely attributed to innovation, investment, and fierce competition among telecommunications firms, particularly Internet service providers (ISPs) and pioneering technology companies. In the 16 years between 1996 and 2012, telecommunications companies invested more than \$1.2 trillion in wireline, wireless, and cable broadband expenditures, with \$68 billion invested in 2012 alone.³

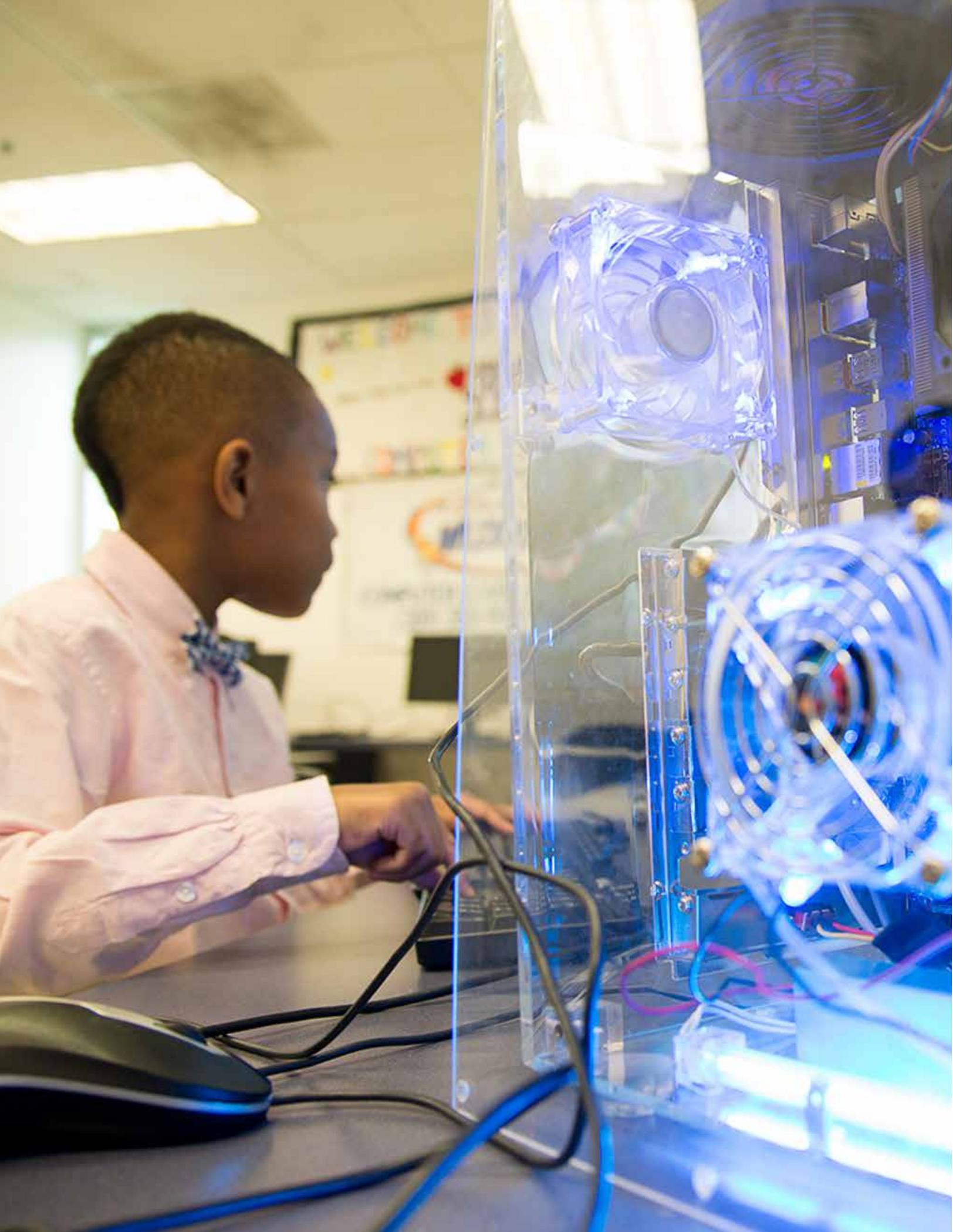
The monumental investment has paid off, with broadband adoption among adults (age 16 and over) jumping from 3 percent in 2000, to 55 percent in 2008, and finally to 70 percent in September 2013, according to the Pew Research Center's Internet & American Life Project.⁴ Pew also found that 94 percent of Americans have access to a wireline broadband connection, and

close to 99 percent have access to a wireless signal. Similarly, as of 2013, more than 500 million broadband-capable devices were in American homes, including smartphones, tablets, and computers.⁵

Widespread access, however, does not translate into widespread adoption. The remaining 30 percent of Americans who do not have home broadband service, roughly 94 million people, are not able to reap the full benefits the Internet has to offer. In the District of Columbia, 76 percent of residents have access to a high-speed wireline broadband connection at home. While the District's broadband adoption rate is higher than the national average, there are still more than 160,000 residents without home Internet service. As more and more information and essential services move online, District residents who do not have broadband at home are at risk of being left behind.

This report will assess the state of the digital divide in the District of Columbia and describe the city's efforts to make the Internet accessible to all residents. Part one of the report details the benefits of broadband, examines the digital divide in the city, and discusses why some District residents are still not online. Part two discusses the federal response to addressing national disparities in broadband adoption as well as recent and ongoing efforts by the District of Columbia Government and other local stakeholders to promote digital inclusion. Part three outlines strategies to leverage existing resources and partnerships to foster further digital inclusion.

**On January 29, 2015 the FCC revised the benchmark definition of broadband and set downloads at a speed of 25 megabits per second and uploads of 3 megabits per second. The previous standard was 4 megabits per second for downloads and 1 megabit per second for uploads. References to broadband in this report are based on the previous standard.*



Part One:

The Digital Divide

Internet Access: Why it Matters

In today's increasingly connected world, the ability to use and access broadband-enabled technology is vital. Access to and knowledge of broadband's many benefits gives users a distinct competitive edge over those who do not use it. The following is an overview of the many benefits broadband has to offer.

Employment

With a broadband Internet connection, job-seekers have the ability to access employment-related search engines, apply for jobs, and find employment training and counseling services. In fact, companies today increasingly are only advertising jobs and accepting applications online. Businesses also can leverage broadband to streamline critical components of human resource management, including recruitment, hiring, and employee training.

One of the most important economic advantages of broadband is the ability for individuals and businesses to expand their capabilities and develop new products and services for the online marketplace. The broadband and technological revolution has spawned countless small and large business enterprises, created millions of jobs, and made the technology sector a vital component of the United States' economy.



Education

Access to the Internet has helped make learning a lifelong endeavor. The vast majority of libraries, schools, and universities in the U.S. have high-speed broadband connections, due in large part to the Universal Service Fund's E-Rate program.⁶ Schools utilize the Internet to offer interactive learning both inside the classroom and out, and many employ virtual classrooms, connecting students and teachers all over the world.

Broadband offers students at all levels unprecedented access to resources, including scholarship and loan opportunities and college applications. As more and more textbooks and publications are being published online, students who have home broadband are able to access thousands of academic databases. Digital learning can also involve certification and technical degrees that can help low-wage earners get a leg up in today's ever-competitive economy. Moreover, many municipalities, including the District of Columbia, now provide GED certification online.

Health

The importance of broadband Internet is evident in the recent implementation of the Affordable Care Act, during which time online health exchange marketplaces were established through the federal government and a number of states. With broadband, individuals can sign up for health insurance, schedule appointments, pay premiums, research health issues, and seek out medical advice. In addition, telemedicine allows patients to receive remote medical care and real-time monitoring.

Government Services

Governments at the federal, state, and local level have moved an increasing number of their services online. A broadband connection allows residents to conveniently apply for licenses and permits, pay traffic fines, submit tax returns, apply for unemployment insurance, and obtain essential social services.

Social Networking

One of the most important aspects of the broadband revolution has been the rapid creation of social media applications. By using popular social networking sites such as Facebook, Twitter and Instagram, people with broadband-connected devices can communicate and keep in touch with friends and family members at all times wherever they are. Online social networking services allow people to forge new connections and relationships based on common interests.

Civic Engagement

Broadband has emerged as an important tool in civic and political engagement, enabling users to connect with, participate in, and support political and social causes. Through neighborhood blogs and newsletters, everyday citizens can voice their perspectives on the issues that matter most to them. Broadband has made it easy for activists, advocacy organizations, and political candidates to engage supporters through email newsletters, online petitions, and online campaign donations.

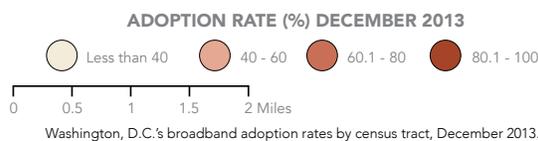
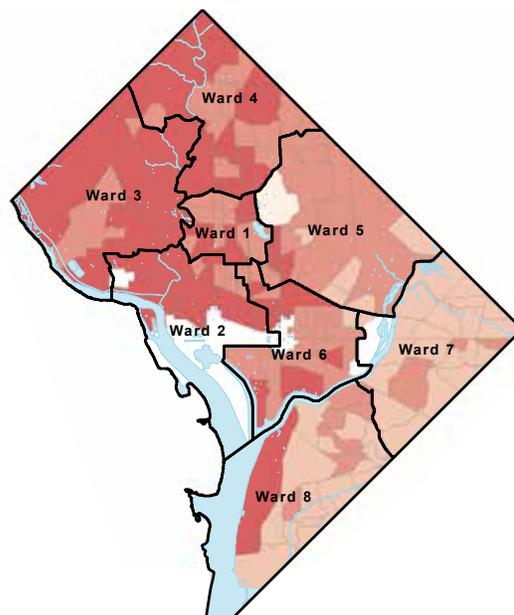
Entertainment and Media

Broadband has also changed the way people consume media. Broadband users are able to keep up with their favorite television shows through websites like Netflix and Hulu. Moreover, services such as YouTube, Pandora, Spotify, and many others have grown in influence as users continue to transition from traditional media outlets to user-centric, on-demand online music streaming services.

Gaming enthusiasts also experience a plethora of new features when connected to broadband. Video gamers connected via gaming consoles, computers, and mobile broadband devices are able to play cooperatively with other gamers across the country and the world.

What is the Digital Divide?

While there is no single definition, the digital divide is commonly understood to be the disparities between people with useful access to digital and information technologies and those with little to no access at all. In 2010, the National Telecommunications and Information Administration (NTIA) released a report that supported earlier findings: broadband adoption rates differ drastically along socioeconomic, geographic, and ethnic and racial lines. Broadband adopters have higher incomes, more education, live in urban and suburban areas, and tend to



be younger than their offline counterparts. NTIA also found lower home broadband adoption rates among African American and Hispanic populations, even after adjusting for socioeconomic factors.⁷

The home wireline broadband adoption rate in the District of Columbia is 76 percent.⁸ While that rate is four percentage points higher than the national average, like much of the country, broadband adoption in the District is strongly correlated with education and income. In Ward 5, 7, and 8, where, on average, close to three out of every ten residents live in poverty, the average home broadband adoption rate is less than 65 percent. The average broadband adoption rate for the other five wards, where fewer than 2 out of every 10 residents live in poverty, is 85 percent.⁹

The reasons for this digital divide are varied and often complicated. When the Federal Communications Commission (FCC) unveiled its National Broadband Plan in 2010, three primary challenges were identified as major obstacles to adoption. These challenges were identified as broadband affordability, access to reliable broadband services, and perceived utility or relevance. In the District of Columbia, however, access to home broadband and mobile broadband is nearly universal. Instead, digital literacy—the knowledge of and ability to navigate basic technological functions—has emerged as a leading obstacle to broadband adoption.

Barriers to Home Broadband Adoption

Cost

The issue of affordability continues to be a leading obstacle for people without home broadband service. District residents, like many other Americans, often purchase Internet service as part of a bundled package that also includes cable television and home phone service. One 2013 report by the New America Foundation found that “triple-play” packages from the city’s main service providers (RCN, Verizon, and Comcast) averaged between \$68 and \$112 per month.¹⁰ Even wireless solutions such as personal hotspots that can be used at home are cost prohibitive for many low-income families, with prices that start at \$35 per month for 1.5 Gigabits of data.

Relevance

A national Pew Internet study found that 34 percent of non-Internet users feel the Internet is not relevant to them.¹¹ The respondents reported not wanting the Internet, not using it, or having no need for it. This lack of perceived relevance is a major barrier for individuals who would likely reap the social, economic, and personal benefits of being online.



Digital Literacy

Digital literacy refers to the knowledge and skills one must possess to navigate high-tech devices and software applications. Individuals who do not possess the skills necessary to utilize the most basic technology functions may become overwhelmed and avoid activities that involve technology and broadband.

Access

In the District of Columbia, access to some form of broadband connection is virtually universal, with availability of home wireline broadband at 100 percent.¹² However, equal availability does not imply equal access. District residents who do not subscribe to home or mobile broadband but still desire to reap the benefits of broadband, particularly low-income residents, require broadband access through free public wireless hotspots and public computer labs located in libraries and other community anchor institutions.

Other Factors

Adult Literacy

One of the most fundamental challenges facing hard-to-reach and historically disadvantaged communities is the high rates of adult illiteracy. Given the strong link between low literacy and poverty, it is no surprise that illiteracy rates, much like digital disparities, are highest in Wards 5, 7, and 8.¹³ Low literacy can be attributed to a number of complex educational, socioeconomic, and institutional factors but the ability to use technology to access and act upon information is one of the components included in the broader definition of literacy.

Privacy and Security

Concerns over privacy and security regarding personal information online are a major barrier to technology use. These concerns are legitimate, given the vulnerability of personal or financial information stored online. Moreover, residents who may have had bad experiences in the past with computer viruses or predatory scams are especially wary. According to OCTO’s 2011 Broadband Adoption survey, residents who do not use the Internet at all express the most concern (45 percent) about online privacy and security.¹⁴

Mobile Access

Today, more than 90 percent of American adults own a cell phone and a majority of them have a broadband-enabled mobile phone. According to the Pew Research Center, 58 percent of Americans own a smartphone and 83 percent of adults ages 18-29 access the Internet through mobile devices.¹⁵

A higher percentage of African-American and Hispanic adults own smartphones than white adults, and 64 percent of African Americans utilize mobile devices as their primary portal to the web.¹⁶ Although mobile broadband offers invaluable access to a variety of useful applications, it generally is not an adequate substitute for a home broadband connection because it limits the types of activities users can perform.

Who's Offline and Why?

Low-Income Residents

The digital divide is particularly stark among D.C.'s low-income, working poor, and unemployed populations. Families with little or no income are too often unable to afford broadband services at home. Families living in poverty are faced with tough choices. Although broadband is an increasingly vital resource in the technology age, paying for an Internet connection is often a lower priority when compared to more basic and immediate needs, such as food, housing, and transportation.

According to OCTO's Broadband Adoption Survey, low-income Internet users are significantly more likely to use Internet somewhere other than home, are more likely to use dial-up services, and are significantly less likely to use

broadband at home.¹⁸

Low-income residents who do not have home broadband connections are at a distinct disadvantage. Job-seekers must rely on public broadband access to apply for jobs and print out résumés. Those without cars are forced to walk or spend money on public transportation to these access centers. School children and working college students with limited technology and broadband access are also at a distinct competitive disadvantage, as more and more school and learning activities are moving into the digital space.

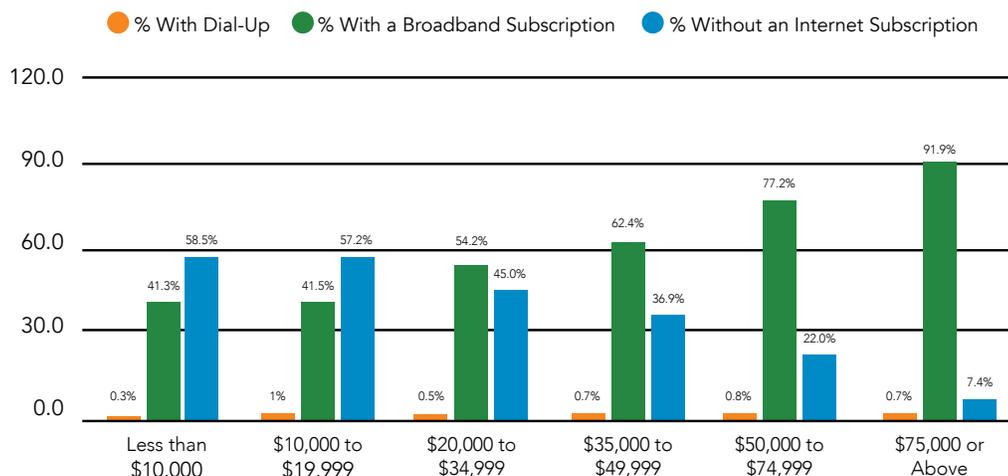
Seniors

In the United States, 43 percent of adults 65 years and older do not connect to the Internet, and only 47 percent are broadband users.¹⁹ In the District, 58 percent of adults age 65 and older reported having a broadband connection at home in 2013.²⁰ Older adults often are intimidated by broadband and digital technologies. Learning how to use technology and broadband-connected devices can be overwhelming for people who lived the majority of their lives prior to the widespread adoption of technology and broadband. Additionally, seniors may be afraid of potential dangers on the Internet, such as identity thieves, predatory advertising, and computer viruses. Moreover, many seniors, particularly those on fixed incomes, cannot afford the cost of in-home broadband access.





D.C. Household Income and Internet Subscription



Source: U.S. Census Bureau, 2013 American Community Survey 1-Year Estimates, "B28004 Household Income In The Last 12 Months (In 2013 Inflation-Adjusted Dollars) By Presence And Type Of Internet Subscription In Household," 2014.¹⁷

Returning Citizens

The District of Columbia's high incarceration rate gives the city unique challenges in preparing and reintegrating returning citizens back into society.²¹ Prisoners typically are given very limited, if any, exposure to advanced forms of technology, and many are returning home after spending much of their lives incarcerated. These returning citizens are faced with a rapidly changing, technology-dependent society. Advanced, high-tech tools and applications, such as computers, software, and mobile phones that are vital to today's competitive economy are completely foreign and unfamiliar to some. As such, members of this population face obstacles that make it difficult to find employment, search for housing, and access other important social services.



Part Two:

Bridging the Digital Divide in the District of Columbia

Federal Government

The federal government has long recognized the significance of broadband and digital technology to all sectors of American society. Through a wide range of agencies and programs, the federal government has provided assistance and substantial resources to assist state, local, and municipal digital inclusion efforts.

Federal Communications Commission

The Federal Communications Commission's (FCC) Universal Service Fund (USF) has provided substantial and consistent funding to governments and service providers in support of access to affordable and high-quality technology and broadband services. The USF's Universal Service Schools and Libraries Program, also known as "E-Rate," provides more than \$2 billion annually in discounts for affordable telecommunications and Internet access for schools and libraries. Since 2008, the District's public libraries and schools have been able to install state-of-the-art tech equipment and high-speed broadband services due in large part to more than \$68 million in E-Rate assistance.²²

Department of Commerce

In response to the Great Recession of 2008, the United States Congress passed the American Recovery and Reinvestment Act of 2009 (ARRA), also known as the Recovery Act. The Recovery Act set aside \$787 billion in direct spending in all sectors of the U.S. economy to stimulate job creation, develop infrastructure, and provide direct relief to those most affected by the

recession. Grant programs designed to stimulate broadband infrastructure and adoption in underserved areas were also included in the Recovery Act. Two of these programs, the Broadband Technology Opportunities Program (BTOP) and the State Broadband Initiative (SBI), were administered by the National Telecommunications and Information Administration (NTIA) under the Department of Commerce.

The District of Columbia applied for and received grants within three BTOP categories as well as one SBI grant from NTIA. The descriptions below outline the types of state and local projects each grant funded.²³

Comprehensive Community Infrastructure (CCI)

"Projects to deploy new or improved broadband Internet facilities (e.g., laying new fiber-optic cables or upgrading wireless towers) and to connect "community anchor institutions" such as schools, libraries, hospitals, and public safety facilities. These networks help ensure sustainable community growth and provide the foundation for enhanced household and business broadband Internet services."²⁴

Sustainable Broadband Adoption (SBA)

"Projects that focus on increasing broadband Internet usage and adoption, including among vulnerable populations where broadband technology traditionally has been underutilized. Many projects include digital literacy training and outreach campaigns to increase the relevance of broadband in people's everyday lives."²⁵



Public Computer Centers (PCC)

"Projects to establish new public computer facilities or upgrade existing ones that provide broadband access to the general public or to specific vulnerable populations, such as low-income individuals, the unemployed, seniors, children, minorities, and people with disabilities."²⁶

State Broadband Initiative (SBI)

"Launched in 2009, NTIA's State Broadband Initiative (SBI) implements the joint purposes of the Recovery Act and the Broadband Data Improvement Act, which

envisioned a comprehensive program, led by state entities or non-profit organizations working at their direction, to facilitate the integration of broadband and information technology into state and local economies. Economic development, energy efficiency, and advances in education and health care rely not only on broadband infrastructure, but also on the knowledge and tools to leverage that infrastructure."²⁷

District of Columbia Government

The District of Columbia Government recognized the importance of broadband access early in the digital age and deployed high-speed Internet and computer hardware in local public schools and neighborhood libraries. Those efforts were further enhanced in 2010 by \$25 million in federal grant funding from NTIA. The District used these grants to execute new digital inclusion projects and expand existing technology initiatives.

Office of the Chief Technology Officer

As the District of Columbia Government's central technology agency, the Office of the Chief Technology Officer (OCTO) has been at the forefront of advancing initiatives to promote digital inclusion in the District. OCTO executed projects in three NTIA grant categories (CCI, SBA, and SBI) that addressed the digital divide through investments in broadband infrastructure, digital literacy training, data collection and community coordination.

DC-Net Citywide Communications Network

Formed in 2002, DC-Net provides and maintains Internet, voice, data, video, wireless, and web hosting services to all District government agencies. In the 13 years since its creation, DC-Net has engineered, managed, maintained, and installed more than 600 miles of fiber throughout the District.

DC Community Access Network (DC-CAN)

OCTO received \$17.5 million to build DC-CAN, a federally funded project that brought affordable broadband services to community anchor institutions primarily in broadband-underserved areas of the District. DC-Net extended its fiber network by nearly 200 miles and provided low-cost broadband service to 291 community anchors, including colleges and universities, schools, libraries, and health care facilities—many in Wards 5, 7, and 8.²⁸ Some of the organizations provide essential services to the District's most vulnerable populations, particularly low-income families. DC-CAN helped one nonprofit, Community of Hope, provide WiFi in its buildings, enabling homeless families at housing sites to search for jobs and access essential services. DC-CAN also allowed Community of Hope to accelerate its switch to Electronic Medical Records that allow its

providers to track and manage chronic diseases. In addition to providing more affordable services to community anchor institutions, the DC-CAN project also enabled DC-Net to provide "middle-mile" services to "last-mile" ISPs at a below-market rate in order to provide low-cost Internet access to low-income and underserved families.

Public Wi-Fi

As part of its strategy to ensure that everyone in the District has access to public Wi-Fi, DC-Net has deployed more than 600 indoor and outdoor hotspots throughout the city, including at all public libraries, many recreation centers and parks, on the National Mall, and the R.I.S.E Demonstration Center on the St. Elizabeths East campus.

Connect.DC

Formed in 2011 using two multi-year federal grants, Connect.DC works to bring affordable Internet access, training, and education to the approximately 160,000 District residents who lack home broadband service. As the city's digital inclusion initiative, Connect.DC partners with other District government agencies, local nonprofits, community leaders, and civic innovators to make technology easier to use, more accessible, more affordable, and more relevant to the everyday lives of District residents.

DC Broadband Education Training and Adoption (DC-BETA)

The District of Columbia used \$4.2 million in federal grant funding to provide broadband-related outreach, digital literacy and workforce skills training, refurbished computers, and subsidized broadband access through resource centers in economically troubled neighborhoods in Wards 5, 7, and 8. Byte Back, one of the project's partners, provided digital literacy training at 11 neighborhood libraries and 10 nonprofit organizations. In addition, the University of the District of Columbia Community College (UDC-CC) incorporated computer training into existing career and workforce development classes at three locations. OCTO also issued a subgrant to the Latino Economic Development Center to provide computer training to small business owners and entrepreneurs in the District.

As a result of these partnerships, nearly 8,000 students were trained in office skills, basic computer skills, college prep, and career and technical training.²⁹ More than



1,200 students who completed the course received free refurbished computers and more than 2,500 became new broadband subscribers, with some receiving up to one year of subsidized broadband service.³⁰

The DC-BETA project also funded outreach and public education activities. Connect.DC's "Get Connected" campaign utilized public transit, print, and direct mail ads to raise awareness of the benefits of home broadband access and connect families to important technology resources. The one-month campaign, launched in December 2013, resulted in more than 200 low-cost

broadband service subscriptions and an addition of more than 400 residents to "The Bridge", Connect.DC's SMS-based mobile platform, according to an analysis of internal data.

DC State Broadband Initiative (DC-SBI)

OCTO received \$4 million from the SBI grant for data collection, technical assistance to location institutions, and broadband planning and coordination activities.

OCTO's Geographic Information System (GIS) program managed the data collection activities under the SBI

grant. GIS created multiple broadband tools for the public, including an interactive map, speed test, and use survey. They also calculated citywide broadband adoption rates, by ward, each year between 2010 and 2013. In addition, GIS commissioned a research study on broadband adoption in the District in 2011. More than eight hundred District residents participated in a random phone survey to learn more about residents who were offline, understand differences in home Internet and smartphone use, and identify underserved communities. The study found that 51 percent of households with incomes less than \$25,000 had home broadband access.³¹ The study also found that 19 percent of seniors (55 and older) did not use the Internet and only 56 percent had broadband at home.³² In addition, 78 percent of respondents owned laptop computers and 90 percent of residents owned mobile phones.³³ The survey also found that more than 75 percent of respondents saw a clear role for the District government to provide public access to computers, Internet service, and basic digital literacy training.³⁴

OCTO also used SBI funds to provide technical assistance to local institutions, resolve broadband-related obstacles, and coordinate stakeholder activities across the District. Seven Community Broadband Summits were held over the course of the grant to connect local stakeholders to technology resources and training, discuss important technology trends, and share best practices in digital engagement, technology integration, and entrepreneurship.

Prior to the 2011 the District did not have a single program focused on addressing the city's digital divide. OCTO used the SBI grant to create Connect.DC and brand it as the District's digital inclusion initiative. The grant enabled Connect.DC to launch a website with important information and resources, including a page for community partners interested in reserving the Mobile Tech Lab (MTL)—a 48-foot converted bookmobile equipped with computers and wireless Internet. Connect.DC also created marketing materials to provide valuable information to District residents about low-cost Internet offers, public computer and Internet access locations, and a "digital citizenship" guide to highlight twelve areas of everyday life that can be improved with access to the Internet. Connect.DC also created donation cards for District residents interested in helping subsidize the cost of Internet service and hardware for low-income families.

One SBI-funded project, the Connected Communities

Initiative (CCI), enabled Connect.DC to take a more focused approach to addressing broadband adoption disparities in the District. CCI was created to increase Internet access and use by residents, businesses, and community institutions in low- and moderate-income neighborhoods in the District. The initial planning phase of Connected Communities, funded by SBI, included focus groups and the creation of community technology plans for two neighborhoods in Ward 7 (Benning Ridge and Marshall Heights) and three in Ward 8 (Anacostia, Barry Farm, and Hillside).

The immediate and long-term goals of Connected Communities are to:

- Engage community stakeholders about their barriers to technology;
- Increase home broadband access and technology use in each neighborhood;
- Make technology relevant to the lives of residents and create interactive projects that demonstrate tangible ways to use it; and
- Develop community technology plans for each digital footprint with actionable digital inclusion strategies.

Connect.DC was inspired to create Connected Communities by observing successful and groundbreaking initiatives in other cities across the country, including: Chicago's Smart Communities Initiative and Milwaukee's Building Digital Communities pilot program. Each initiative used a multi-pronged approach that involved local government leadership, ongoing community, and multi-sector partnerships to implement hyperlocal initiatives and relevant programs (computer training, employment, workforce development, etc.).

District of Columbia Public Library

The District of Columbia Public Library (DCPL) supports children, teens, and adults with services and materials that promote reading, success in school, lifelong learning, and personal growth. DCPL includes a central library (Martin Luther King Jr. Memorial Library) and 25 neighborhood libraries. DCPL has provided public access computers for the past 14 years and currently manages more than 1,000 desktops across the District. The computer lab in the central library, Martin Luther King, Jr. Memorial Library, is dedicated to providing hands-on computer training to District residents who register in advance for these programs.

DC Community Computing Resources (DC-CCR)

DCPL received \$1.5 million in federal grant funding to increase the number of computers, upgrade equipment, and improve the quality of Internet service at neighborhood libraries and recreation centers throughout the District. The DC-CCR project also provided funding for computer training at public computing sites across the city.

The ability to access computers and Internet service in libraries is critically important to the residents who do not have broadband service at home. The DC-CCR project helped cut down wait times at several libraries that provide access to vulnerable populations, including low-income individuals, seniors, and people with disabilities. Increased capacity in neighborhood libraries also allows unemployed job-seekers to update their resumes, search for jobs, and apply for unemployment benefits. In addition to providing open access at neighborhood libraries, DCPL also utilized internal staff to provide one-on-one employment assistance to job-seekers at twenty locations. D.C. residents also received training in basic Internet and computer use, Microsoft Office, and social media.

District of Columbia Office on Aging

The District of Columbia Office on Aging (DCOA) partnered with Connect.DC to install computers at six senior wellness centers and offer free computer access and basic digital literacy training to District seniors aged 60 and over as well as disabled residents of all ages.

DCOA also partnered with the Office of Unified Communications (OUC) on Connect.DC's Mobile Tech Lab to enroll seniors in OUC's Smart 911 application. Smart911 is a free service that allows residents to create a safety profile that includes any information they want first responders to have in the event of an emergency.

Department of Employment Services

The Department of Employment Services (DOES), supported with resources from the District government

and the US Department of Labor, operates the American Job Center to offer job-seekers, students, and career professionals access to employment-related services and tools. Through the District's American Job Center, residents can utilize resources such as career planning and counseling, resume assistance, direct job placement, on-the-job-training, and computer training programs. Residents can also use the American Job Center to access more advanced technical training, including Microsoft, A+, and Cisco certifications.

DOES also offers a grant program for small businesses to train District residents on basic to advanced computer and literacy skills. DOES solicits grant proposals to qualified local disadvantaged business enterprises (LSDBEs). Businesses that receive grant funds offer training courses to residents in underserved neighborhoods.

Office on Returning Citizen Affairs

Under the DC-BETA project, the District's Office on Returning Citizen Affairs (ORCA) worked with Byte Back and Connect.DC to provide District residents returning from incarceration with tech skills that would help them secure employment and increase their chances of successfully integrating back into their communities. ORCA's training programs provided a nonjudgmental, welcoming environment for returning citizens to learn basic computer skills. ORCA recognized that individuals with criminal records have difficulty finding gainful employment, so an important part of its training involved teaching entrepreneurial skills to returning citizens interested in starting their own business.

Nonprofits and Academic Institutions

Addressing the District's digital disparities is not something government, whether federal or local, can do alone. A number of nonprofits and academic institutions provide computer access and training to District residents. The following sections highlight the efforts of organizations serving the District residents most likely to be offline.



EveryoneOn

EveryoneOn, a national nonprofit, is Connect.DC's most important partner in providing affordable broadband to low-income residents in the District's underserved neighborhoods. EveryoneOn promotes digital inclusion by negotiating low-cost, high-speed Internet offers with a variety of Internet service providers and working with local nonprofits to provide low-income Americans with resources on how to use technology. In the past two years, approximately 161,000 households from across the country have signed up to receive low-cost broadband through EveryoneOn.³⁵

EveryoneOn offers multiple broadband options in the District, including Comcast Internet Essentials, a national program that provides home broadband service for \$9.95 per month to qualifying families with at least one child eligible to participate in the National School Lunch Program. Connect.DC and EveryoneOn pledged to sign up 1,000 District households to low-cost broadband services and distribute 500 computers to qualifying households by September 2015.

Byte Back

Byte Back is a local nonprofit that provides computer and job training services to low-income adults. Founded in 1997 and serving over one thousand people each year, Byte Back is a recognized leader in the District's efforts to bridge the digital divide. Byte Back offers three levels of computer classes: digital literacy courses for students who need basic computer skills, a Microsoft Office course for individuals seeking administrative positions, and computer certifications for students interested in information technology careers.

Byte Back was a key partner in the District's DC-BETA grant project and taught more than 200 computer courses at 23 locations, including eleven libraries and ten community-based organizations, over the course of the grant.³⁶ Byte Back trained 1,657 students during the grant project, 78 percent of whom were unemployed at the time.³⁷ In addition, 89 percent reported not having high-speed Internet access at home.³⁸

Byte Back's work to address technology disparities in the District did not end with the expiration of the DC-BETA grant. According to its FY14 Annual Report, Byte Back trained more than 1,200 people in courses ranging

from computer basics to A+ certification.³⁹ More than 75 percent of the students received public benefits and more than 45 percent were unemployed.⁴⁰ Graduates of Byte Back's programs used their new skills to continue their education, find new jobs, and improve existing businesses.

Byte Back's contributions to digital inclusion are not limited to training and education. In April 2013, Byte Back established the First Time Technology (FTT) program to provide refurbished computers to its graduates and other low-income individuals. FTT also provide computer repair and support services to District residents and local nonprofits.

Latino Economic Development Center (LEDC)

LEDC and Connect.DC partnered in November 2012 to launch the Small Business Success Project to teach entrepreneurs how to improve their businesses through technology. The pilot was funded by the DC-BETA project. In nine months, LEDC trained 197 small business owners and entrepreneurs in the District, including a mix of start-ups and existing businesses.⁴¹ Of the 197 trained, 26 percent were from Wards 5,7, and 8.⁴² Training workshops ranged from basic digital literacy to advanced skills and topic areas included Starting a Business, Crowdfunding, Client Relationship Management, Getting Your Business Online/Website Development and Social Media for Small Businesses.

LEDC also provided intensive technical assistance to 33 entrepreneurs during the life of the project. LEDC helped them apply for licenses, launch their businesses, create websites, secure leases for commercial space in the District, and apply for business loans.⁴³ In addition, 21 participants received a combination of subsidized hardware, software, and Internet service to grow their businesses at the end of the project.⁴⁴

United Planning Organization (UPO)

UPO is a 52-year-old nonprofit organization that was created to plan, coordinate, and implement human service programs for low-income residents in the District of Columbia. UPO's services include early education and youth development programs, housing and shelter assistance, financial literacy, and community health programs. UPO also provides adult education and training services, including technology training, to residents in need.

One of UPO's partners in addressing the digital divide is The H.O.P.E Project—a career training program dedicated to getting District residents the tech skills they need for gainful employment. The H.O.P.E. Project, founded by social entrepreneur Raymond



Bell, trains young adults, often unemployed at the time of enrollment, from economically disadvantaged backgrounds for entry-level technical support positions. UPO has also partnered with Connect.DC to identify and assist qualified residents in obtaining low-cost broadband services and refurbished hardware.

Capital Area Asset Builders (CAAB)

CAAB helps District residents achieve stability through financial independence. CAAB's training and education programs help low- to moderate-income individuals and families improve money management skills, grow their savings, and build wealth through smart investing. As a key part of financial education, District residents are introduced to online banking and financial tracking applications via personal mobile devices.

Uplift, Inc.

Founded in 2008 by Google Scholar Leshell Hatley, Uplift, Inc. has used funding from The MacArthur Foundation, ING Unsung Heroes and Google RISE to teach youth classes in science, technology, engineering, and math (STEM). The organization's classes in app development, game design, computer graphics, and web development teach young people problem-solving skills and demonstrate the real-world impact technology can have on their lives and in their communities.

Sunshine Early Learning Center

Sunshine Early Learning Center is a licensed childcare provider that offers research-based, innovative education programs to children and families in Wards 7 and 8. The center serves children ages 6 months to 12 years old and participates in the District's universal pre-kindergarten



system. One of their Pre-k programs, combining science and language skills, uses applications on iPads to increase vocabulary, advance language development and educate children about words related to growing plants. In addition, Sunshine Early Learning Center uses a state of the art, touchscreen desktop computer with children in their toddler classrooms that tracks the progress of children in 18 skill areas critical to ensuring success in school.

University of the District of Columbia Community College (UDC-CC)

Another key DC-BETA training partner, the UDC-CC provided more than 5,300 students with Career and Technical Education (CTE) training under the program.⁴⁵ UDC-CC also enrolled 82 new household Internet subscribers under the Comcast Internet Essentials program, and distributed 200 new HP laptops to qualified recipients who completed all CTE training courses.⁴⁶

Startup Middle School

The Startup Middle School program is a collaboration of the Howard University Middle School of Mathematics and Science (MS)², Social Sector Innovations, and



mobile solutions firm, Clearly Innovative. Located on the main campus of Howard University, (MS)2 is a public charter school committed to academic excellence, with a specific focus on mathematics and science. The Startup Middle School program prepares students from underrepresented backgrounds to pursue careers in STEM by teaching basic concepts of innovation, entrepreneurship, and problem solving.

Students design and build mobile applications (apps) that reflect their interests, address problems in their communities, or fill a market need. For example, one group of students built an app to help find kidnapped or missing African American children because they believed the media does not provide adequate coverage of missing children from minority communities. Startup Middle School has been recognized for its innovative approach to encouraging the next generation of minority tech entrepreneurs. Students from the program have been featured on National Public Radio and participated in Connect.DC's community technology summit.

Results: Narrowing the Digital Divide

The District of Columbia Government used federal grant funding NTIA to make critical investments in broadband infrastructure, digital literacy and computer training, community coordination, and public technology resources. The investments in public infrastructure helped the city upgrade computers in libraries and other public facilities that played an important role in the District's other three grant-funded projects.

OCTO used the DC-CAN project to provide affordable, high-capacity broadband service to 291 community anchor institutions and installed more than 220 rooftop wireless access points at these sites. Anchor institutions included public schools, community colleges, public housing facilities, healthcare providers, and local nonprofits. Most of the institutions that upgraded to DC-CAN saw a six-fold increase in broadband speeds as well as lower monthly costs.⁴⁷ The additional capacity at the District's neighborhood libraries directly contributed to the success of the DC-CCR project.

Libraries are critically important resources in any serious efforts to bridge the digital divide. During the life of the

DC-CCR project, more than 2.4 million D.C. residents—an average of more than 20,000 per week—took advantage of open access at neighborhood libraries and other public computing centers.⁴⁸ Connect.DC's Mobile Tech Lab also provided open computer and Internet access at more than 90 community events across the city. In addition, more than 1,100 computers were deployed in public facilities, including libraries, public schools, recreation centers, and senior centers.⁴⁹ The District also created a computer lab at the headquarters of the Office on Returning Citizen Affairs to provide computer training to previously incarcerated residents.

More than 49,000 District residents were trained during the life of the city's DC-BETA and DC-CCR projects on topics ranging from basic Internet and computer use to A+ certification.⁵⁰ Residents also received computer-based instruction on less technical, but equally as relevant, topics, including college preparation, employment readiness, and money management. More than 400,000 hours of training were delivered over the life of the grant projects, primarily in community anchor institutions in the District's most economically vulnerable neighborhoods.⁵¹ These programs targeted low-income residents, seniors, and other populations most likely to be offline.

One of the most persistent barriers to home broadband adoption is the cost of Internet service and computer hardware. The DC-BETA project addressed the issue of affordability by providing more than 1,200 refurbished computers and subsidizing up to one year of Internet service for more than 900 residents who successfully completed training.⁵² In addition, Connect.DC's partnership with EveryoneOn gave District residents access to additional low-cost home Internet options. These efforts directly resulted in more than 5,400 new broadband subscribers, with a significant percentage residing in Wards 5, 7, and 8.⁵³

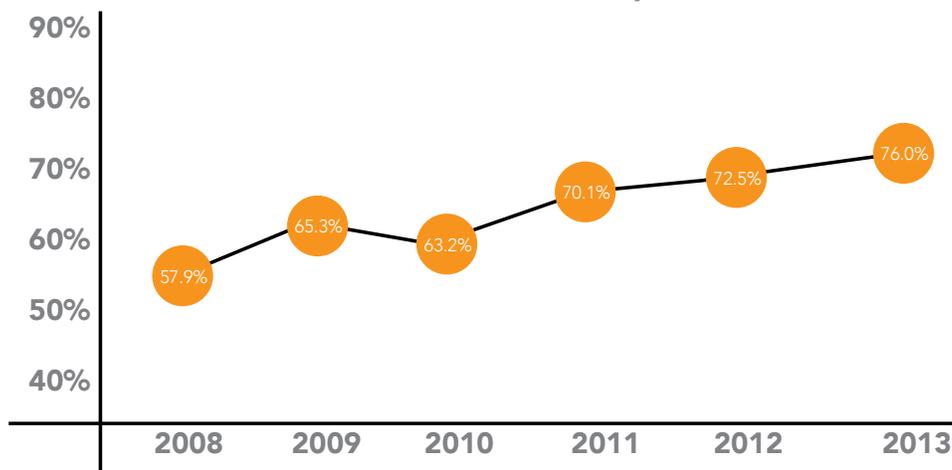
The District of Columbia's four federal grants, local programs, advances in technology, and growing consumer awareness have narrowed the digital divide considerably since 2008. The District's broadband adoption rate has risen by at least ten percentage points in each of the city's eight wards since that time and digital technology is available to more residents now than ever before. The District's overall home



wireline broadband adoption rate rose from 57.9 percent in 2008 to 76 percent in 2013. The adoption rates in Wards 5, 7, and 8 rose from 48.2 percent, 40.4 percent, and 43.7 percent, respectively, to 65.6 percent, 55.1 percent, and 58.4 percent during the same time period.⁵⁴ Furthermore, the number of areas in those three wards considered “underserved”—census tracts with residential wireline adoption rates of less than 40 percent—went from twenty-two in 2008 to zero in 2013.⁵⁵ Barriers to broadband adoption have created challenges

in getting some District residents online; however, due to substantial investments from the federal government and ongoing digital inclusion partnerships between OCTO, District of Columbia Government agencies, and local nonprofits, substantial progress has been made in creating an empowered, technologically inclusive city. While this progress is encouraging, barriers to broadband adoption still persist and with the federally-funded projects now finished, the work to fully bridge the digital divide requires a new path forward.

Home Wireline Broadband Adoption Rate⁵⁶



Part Three:

The Road Forward

Next Steps

The District's home broadband adoption rate has increased significantly since 2008. Three out of four homes have a broadband connection but disparities still remain. More than 160,000 residents are without a high-speed Internet connection and the home broadband rates in Wards 5,7, and 8 are still significantly lower than those in the other five wards.

The city used federal funds, along with local operating dollars, to create sustainable initiatives and programs that will allow the District to continue working to bridge the digital divide. While the grant funds have expired, future efforts from the District of Columbia Government to address continued disparities in basic technology access and skills will continue using Connect.DC's five focus areas of digital inclusion: 1) digital literacy, 2) public technology access, 3) affordable home Internet, 4) relevant programs and content, and 5) public education and awareness.

The five focus areas of digital inclusion provide a roadmap for addressing the digital divide that can be used citywide, but specific attention and resources should be concentrated in the neighborhoods where people are most likely to be offline. Connect.DC started the Connected Communities Initiative (CCI) in 2014 to increase Internet access and use by residents in low-income neighborhoods in the District of Columbia. The planning phase of CCI included the creation of community tech plans with five strategies for increasing broadband adoption and use. While these strategies were based on existing broadband data and feedback from community stakeholders in five neighborhoods, they form the basis for future digital inclusion efforts in other parts of the city.

Strategy 1: Increase Public Education and Awareness Efforts

Public awareness is a necessary component to a comprehensive digital inclusion strategy. Connect.DC

utilizes print and transit media to bring attention to local technology initiative and resources. Text messaging and social media are also used to make residents aware of events and services. Starting in 2015, Connect.DC will also utilize door-to-door canvassers to connect directly with District residents in neighborhoods with low broadband adoption rates. A set of clear and simple messages will be developed to inform community members about the importance of Internet access as well as the resources and services available to residents.

Strategy 2: Expand Digital Literacy and Advanced Training Programs

Connect.DC plans to continue partnering with local training providers to help residents and community stakeholders acquire a basic foundation in technology through digital literacy. Connect.DC will also partner with community organizations to offer intermediate technology courses as well as advanced technical certifications. These courses will build relevant computer skills and provide essential job training services to residents in the footprint. Classes will be held in accessible neighborhood locations, including libraries and community-based organizations, and will offer clear pathways to careers for communities that are underrepresented in the technology field.

Strategy 3: Increase Technology Use by Generating Local Content

One way Connect.DC demonstrates the power of technology to District residents is through its digital citizenship guide—a booklet that highlights twelve different ways, from employment to public safety, being online can improve a person's life. Another way to demonstrate the relevance of technology is to involve residents in the creation of technology tools that address their specific needs, such as an app that helps returning citizens find employers that have a history of hiring people with past criminal records. Connect.DC will continue to partner with community-based partners to generate content that specifically addresses the everyday issues faced by non-adopters.



Strategy 4: Increase Public Technology Resources for Residents and Community Organizations

The ability to access computers and Internet service in libraries, community centers, and other local institutions that are open and accessible to the public is critically important to the residents who do not have broadband service at home. Residents utilize these locations to check email, access essential services, and apply for jobs. Connect.DC will work to improve and expand public technology access in neighborhoods with low broadband adoption rates and continue to use its Tech Locator tool to help residents find locations in their community.

Strategy 5: Expand Access to Affordable Home Internet and Computer Hardware

While public technology access provides a valuable service to residents who need it, home broadband service is universally accepted as the most effective way to ensure residents can take full advantage of everything the Internet has to offer. Connect.DC, through its partnership with EveryoneOn, provides Internet offers as low as \$10 per month and affordable computer hardware for low-income residents and others who qualify.

Unfortunately, one out of four District residents still does not have wired home broadband service, due in part to the cost of Internet access and computer hardware. Connect.DC will work to increase the number of low-cost offers available to District residents and address continuing barriers to home broadband service and availability.

These five strategies for promoting digital inclusion, combined with the CCI program model, provide a foundation for addressing the digital divide that can be tailored to the specific needs of other neighborhoods in the District. With its focus on understanding the everyday challenges of residents and more specific barriers to broadband adoption, CCI offers a replicable model that can be implemented in other neighborhoods with persistently low broadband adoption rates—particularly in Wards 5, 7, and 8. Taking a more hyperlocal approach to digital inclusion allows Connect.DC to focus attention and resources in the areas with the greatest need.

Conclusion

Broadband and digital technologies are even more integrated into all aspects of everyday life than they were when the District received NTIA grants in 2010. At that time close to 40 percent of District residents lacked home broadband access. Now more than 75 percent of residents have high-speed Internet service at home. Broadband access has made it possible for thousands of District residents to apply for jobs, find affordable housing, access essential services, start businesses, and purchase affordable health insurance.

Even though significant progress has been made in addressing technology disparities in the District, much work still remains. There are still more than 160,000 District residents, primarily in the city's poorest neighborhoods, without high-speed Internet access at home. Digital inclusion is a social and economic necessity and District residents must be able to take advantage of broadband technology in order to compete in the 21st century economy.

The District of Columbia Government has continued its investment in broadband infrastructure, computer training, public technology access, and low-cost Internet—all critical steps to promoting broadband adoption for every person in this city, regardless of income, education, or age. As was the case in 2010, however, bridging the digital divide is not a problem the government, whether federal or local, can solve alone. Success will require collaboration at all levels, including new partnerships between the public, private, and nonprofit sectors. As the nation's capital, the District of Columbia must continue to serve as an example of how federal investments can be leveraged to support innovative local programs and ensure full digital citizenship for the country's most vulnerable citizens.



JOHN A. WILSON
BUILDING

JOHN A. WILSON
BUILDING
1350

GOVERNMENT OF THE
DISTRICT
OF COLUMBIA

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About Connect.DC

Connect.DC was formed in 2010 by the Office of the Chief Technology Officer with two grants from the National Telecommunications and Information Administration to remove barriers to Internet access and increase technology use in economically disadvantaged neighborhoods in the District of Columbia.