



**Testimony of Michael Slinger, Director of Google Fiber City Teams, Google Inc.
Before the House Committee on Energy and Commerce
Subcommittee on Communications and Technology
Hearing on "Promoting Broadband Infrastructure Investment"
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Chairman Walden, Ranking Member Eshoo, and Members of the Subcommittee:

Thank you for the invitation to testify before you today about investing in broadband abundant networks. Google shares your vision of the importance of creating a regulatory environment that provides new momentum to increase broadband deployment and adoption nationwide, and to expand access to the Internet and the opportunities it provides to all Americans.

I am Michael Slinger, and I am the Director of Google Fiber City Teams. I am responsible for building Google's fiber business in new Fiber cities, helping cross-functional teams overcome roadblocks in cities that might get in the way of deploying a network, that impact communities, or that affect our end users. Part of my responsibility in this role is to develop strong local teams to support the work we are doing. Unlike some of our other product areas — like our search engine or Google Maps — where most of the work is done digitally, Fiber is a physical project that requires significant construction and intersects with nonprofits, small businesses, property managers, city, state and local governments, local business partners, as well as individual users — a wide swath of the community.

Google embarked on building our gigabit Internet access service over 5 years ago to help make Internet access better and faster for everyone. Google Fiber gives customers upload and download speeds of up to 1,000 megabits per second — which is enough bandwidth for everyone at home, and all their devices, at a competitive price point.

After an extensive vetting process, we announced in 2011 that we would deploy our gigabit network in Kansas City, Kansas. Shortly afterward came Kansas City, Missouri. Today, Google Fiber is also available in Austin, Texas and Provo, Utah. We are in the process of building out our network in Salt Lake City, Nashville, and Charlotte, as well as the metro areas around Atlanta and Raleigh-Durham. We are also exploring bringing Fiber to four additional metro areas: Phoenix, Portland, San Antonio, and San Jose.

Our Fiber markets typically have city leaders with a vision for how gigabit connectivity can make their community stronger, and who work closely with us to develop a clear plan for how to build Fiber throughout the area in a way that's efficient and the least disruptive.

Unfortunately, many consumers don't have much choice in broadband providers, and gigabit Internet is still a dream for most. Market-based solutions are critical to closing the gap, yet regulation on the federal, state, and local levels has not kept pace with technological innovation and competition. Some regulations, such as those addressing access to infrastructure, sometimes even compound barriers to broadband deployment.

We're grateful for the opportunity to share our thoughts on the benefits of gigabit networks, our experience building out Google Fiber, and the ways government can help encourage further deployment and adoption. Policymakers' top broadband goal should be achieving broadband abundance — which requires reducing the cost of network buildout and removing barriers that limit providers' ability to reach consumers. The key is to focus on competition, investment, and adoption.

Gigabit Network Benefits

While it is still early days for these networks, we are starting to see the benefits of widespread gigabit availability. Investment in physical infrastructure and labor creates construction jobs and increases demand for inputs like electronics and fiber optic cable. New research from the Fiber to the Home Council shows gigabit networks are contributing billions of dollars in economic growth, and estimates that communities with gigabit Internet have per capita GDP that is 1.1 percent higher than communities with limited or no gigabit service. Moreover, the Fiber to the Home Council recently released a study showing that access to fiber increases home values by 3.1 percent.

We have seen firsthand that next generation broadband infrastructure can also shift economic activity, attracting new businesses and sparking local tech scenes. A super-fast Internet connection can have a particularly large impact on unlocking new possibilities for small businesses. In some of our Fiber cities, small business owners are using Google Fiber to help them save money, work better together, reach new parts of the world without boarding a plane, and save time for the important things — like growing their business.

Consider the exciting economic developments we've seen in Kansas City, our first Fiber city. We have seen entrepreneurs and companies from across America pick up their roots and move there, citing Google Fiber as one of the reasons.

For instance, Nick Budidharma, an 18-year-old game developer, drove with his parents from Hilton Head, S.C., to live in a "hacker home" that's connected to the Google Fiber broadband network. Synthia Payne relocated from Denver to launch a startup that aims to let musicians play together in real-time online. And a local gathering for entrepreneurs keeps growing and growing — often attracting a standing-room-only crowd of hundreds of businesspeople, investors and city officials.

The influx of all of these entrepreneurs led to the emergence of the Kansas City Startup Village, a grassroots startup hub in our very first Google Fiber neighborhood. In its first few years, it has attracted 25 startups from as far away as Boston, New York, Florida and California. The startup village has also become a must-visit location for venture capital firms who want to invest in hot Kansas City technology. A well-known tech investor, Brad Feld, even opened the "Feld KC Fiberhouse," where up to five startup founders can live and work rent-free for one year.

Kansas City has become a legitimate Midwest tech hub, nationally recognized for these successful tech startups — but also increasingly a place where established companies are relocating as well. BIME Analytics, a French cloud computing firm, moved to Kansas City because "Google Fiber helped to validate Kansas City as a technology town." This influx of businesses and capital, spurred in part by Google Fiber, was one of the reasons Fitch improved Kansas City, Missouri's debt rating a few years ago.

Access to abundant, superfast Internet can also open up new opportunities across all facets of a community — from access to healthcare and education technologies to improved energy use, public safety, and transportation. In Kansas City, the City Public Library established the Software Lending Library in partnership with the KC Digital Drive and Mozilla. The program enables patrons to check out and use high bandwidth applications and premium software on their laptops through a system connected to Google Fiber. Or take Sightdeck KC, which, in collaboration with Children's Mercy Hospital, is delivering an interactive

collaboration tool with video, voice and graphics that enables a heightened virtual healthcare experience for students and parents, cutting down on missed work and school.

Gigabit Internet is also driving a speed race between broadband providers, giving consumers higher speeds, greater choice, and lower prices. For instance, when Google Fiber announced plans to bring its service to Austin, broadband competitors AT&T and Grande each followed suit with 1 gigabit fiber deployment of their own. Similarly, after Google Fiber announced it was coming to Provo, Comcast said it would offer cheaper broadband and video bundles, and recently announced it will offer a 2 gigabit service later this year in a number of cities around the country.

These are just some examples. But while the benefits of gigabit broadband in a handful of cities to date have been remarkable, the U.S. shouldn't settle for less than abundant broadband access.

Building a Gigabit Network

To respond to communities across America that are demanding more speed for their own homes and businesses, we have to physically build a network from scratch — one street, one utility pole, one house at a time. This means reviewing infrastructure — roads, underground utility paths, and even permitting capabilities — to make sure cities are ready to work with us to design and build a brand new network. We work with cities to create a detailed map of where we can put our thousands of miles of fiber, using existing infrastructure such as utility poles and underground conduit, and doing our best to avoid things like gas and water lines. Then a team of surveyors and engineers will go out into the community to fill in missing details. Once we're done designing the network, we start construction.

Building a fiber network is a big job. It requires digging up street and climbing poles. This can be enormously disruptive to a community that is not ready for it, so Google Fiber created a Fiber city checklist to help communities prepare to build a new fiber-optic network. There is nothing special or exclusive about the Google Fiber checklist. It's a compilation of best practices from the Fiber to the Home Council, Gig U, the U.S. Conference of Mayors, and other industry experts, and it's designed to be a practical, actionable roadmap that makes building new networks easier, faster and less disruptive. Our hope is that any city across America will find these recommendations helpful, whether they're looking to build and run their own fiber network or attract an existing provider to do it.

Through the process of figuring out how to build a gigabit broadband network — and actually living through the financial and physical requirements of this type of construction project — we have gleaned some insights into how regulation can sometimes get in the way of deployment. I'll focus on three types of regulation that make investment harder and interfere with our ability to enable access to abundant broadband connectivity.

First, the process of gaining access to existing infrastructure can impose significant cost and create time delays. One of the biggest challenges facing new broadband entrants such as Google Fiber is gaining access to utility poles and conduits. To construct high-speed networks, broadband providers need access to utility infrastructure, such as utility poles and conduits, on a consistent, cost-effective and timely basis. The process of getting poles ready for our attachments — known as “make-ready” work — typically requires asking other companies to move their communications equipment to make room for Google Fiber's equipment on the same poles. This process takes a lot of time, and can cause significant delays in the construction of a new network.

The FCC recently took helpful action by granting rights for broadband providers that need access to existing infrastructure, including utility poles and conduits/ducts in FCC regulated States. Policymakers can do more to help reduce delays associated with obtaining adequate information and make-ready work, and increasing

access to existing conduit and rights of way. Local governments can take pole maintenance one step further, by proactively working with third parties to create space on the pole for providers. For example, in cities with a municipally owned utility, the utility could perform make-ready work as part of its standard maintenance program and at the same time increase space for new providers. And any city could take action to expedite network builds by requiring "one touch" relocations in their public right of way, whereby when relocations of multiple providers' attachments on a pole are required, all such moves would be made at the same time by use of authorized contractors. This would minimize intrusions and protect public safety and convenience.

Second, access to rights-of-way poses a challenge. When private companies build fiber networks, one of the biggest costs is installing physical fiber lines throughout an entire community, which requires either digging up streets (to put fiber underground) or stringing fiber on utility poles. The expense and complexity of obtaining access to public rights-of-way in some jurisdictions may increase the cost and slow the pace of broadband network investment and deployment.

To help lower these costs, cities could help facilitate partnerships between different entities and companies that are doing local construction. We also see a lot of benefit in instituting "dig once" policies, which may involve the installation of an oversized conduit bank by any new network builder within the right-of-way, to accommodate future users when new roads are being built or opened for maintenance and conduit is not already in place. Cities could also notify companies building out networks that a road is being dug up and allow them to install their own conduit, so long as there is not undue delay. In the context of the U.S. federal highway system, the U.S. GAO points out that "dig once" policies can save up to 25–33% in construction costs in urban areas and roughly 16% in rural areas. Not only is this an attractive option to providers who save the time and expense of digging, but it has the added benefit of reducing future disruption for local citizens (who probably don't want to deal with a future road closure if it can be avoided).

A third challenge is unreasonably high rates for access to video programming. Offering video services increases the value proposition of broadband services, offers more choice for the user, and improves the economics for new broadband infrastructure entrants. Most consumers want to buy Internet and video programming in one package. Encouraging the competitive availability of video services can spur the deployment of high-speed networks, resulting in more consumer choice. However, the FCC's policy of allowing non-cost based discounts for access to video programming under the guise of permitted volume discounts allegedly based on subscribership undermines broadband entry and deployment. The policy should be revised to require programmers to justify how their discounts for the biggest incumbents relate to actual cost savings.

Finally, although we often focus on fiber when discussing broadband abundance, I would be remiss if I failed to mention the importance of balanced spectrum policies that promote innovation in the wireless sector. Wireless service plays a critical role in bringing broadband to rural areas where low population densities and challenging terrain make traditional deployments prohibitively expensive, and to underserved areas that lack robust infrastructure. Whether a consumer uses a DSL, cable or fiber connection, she likely is using Wi-Fi as the last link for connectivity.

To date, wireless growth has been driven by policies that balance both licensed and unlicensed access. Exclusive access to licensed spectrum provides the certainty major operators need to make large investments in their wide-area networks, while broad eligibility for access to unlicensed spectrum fosters widespread contributions to innovation and investment in emerging technologies. Wi-Fi technology, for example, was created using unlicensed spectrum, and, within the United States alone, the economic benefits of unlicensed spectrum technology have reached \$50 billion annually. The uses have been

especially complementary in the wireless broadband space, where the ability to offload data from cellular networks to Wi-Fi has already saved mobile network operators tens of billions of dollars in network deployment costs and expanded connectivity for consumers. Therefore, policy should support robust access to both licensed and unlicensed spectrum at a variety of high, medium, and low frequencies. Where underused spectrum cannot be cleared exclusively for broadband use, spectrum sharing should be a priority.

Helping Consumers Enjoy the Benefits of Gigabit Networks

Beyond making local environments more conducive to broadband infrastructure investment, we also need to invest in digital inclusion so that consumers who today have not adopted broadband have a better understanding of the value and relevance of high speed Internet access to their everyday lives.

About 30 percent of Americans still don't use the Internet at home, leaving them at a disadvantage when it comes to education, job opportunities, and social and civic engagement. Research by the Pew Internet Project has shown that, among adults who do not use the Internet, almost half say that the main reason they don't go online is because they don't think the Internet is relevant to them.

Unfortunately, while the effects of this digital divide are easy to see, the solutions are less obvious. This is a long-term, complex problem — and creating change requires time, a sustained commitment, and close collaboration with local partners who can make progress day by day.

While a broader effort is needed to bring all Americans online, Google Fiber has committed to help address digital inclusion and adoption with community partners and local leaders, following three guiding principles.

First, make the Internet more affordable. We want to help people who haven't had home Internet before get online for the first time. That's why we offer an affordable Basic Internet service. Anyone in a Fiber service area, regardless of income, can choose this package.

Just last week, in partnership with the ConnectHome initiative announced by President Obama and HUD Secretary Castro, we committed to bring our Google Fiber Internet service to residents in select affordable housing properties across all of our Fiber markets for \$0/month and no installation fee. We are also partnering with community organizations on computer labs and digital literacy programming to bridge the digital divide for students and families in these communities. This pilot initiative brings together local governments, private industry, and nonprofit organizations to accelerate Internet adoption by children and families living in HUD-assisted housing. Our commitment was inspired by our partnership with the Housing Authority of the City of Austin (HACA), whose "Unlocking the Connection" program has already achieved a number of successful outcomes — both with respect to residents participating in digital literacy trainings, and signing up for Internet service.

Second, make access a part of the community. For many people, public computing centers and community organizations serve as the on-ramp to the Internet. One example of how Google Fiber has addressed this is our current Community Connections program, launched in our first few Fiber cities, where we are hooking up hundreds of neighborhood institutions so people in Google Fiber cities have a place where they can get access to gigabit speeds even if they do not yet have Internet at home.

Third, teach people how to get online — often referred to as “digital literacy.” Even if access to the Internet is affordable, some people don't see the web as relevant to their lives, or they don't have the skills to use it. Working with partners, Google supports programs that help people learn how to do things like power on a computer, use a search engine, or open an email account. Earlier this summer we launched an

initiative called the Digital Inclusion Fellowship in partnership with the Nonprofit Technology Network (NTEN). The fellowship pairs 16 people with community organizations in our eight Google Fiber metro areas, where they'll spend a year creating programs that get more people connected to the web. For example, the Salt Lake Education Foundation's fellows will teach parents how to communicate with their children's teachers and access grades and attendance records online. Meanwhile, the Triangle Literacy Council's fellow is set to create a mobile computing lab, which will travel to libraries, community centers, jails, and schools to teach people basic online tasks like sending emails or finding health clinics.

We are making these investments in digital inclusion because our goal with Google Fiber is to make the Web faster, more affordable, more relevant, and more useful — for everyone. We are happy to be a part of catalyzing innovation and investment in the race to bring gigabit networks to communities around the country.

Conclusion

To sum up: to construct high-speed networks, broadband providers need access to existing utility infrastructure such as poles and conduits on a consistent, cost-effective, and timely basis. While the FCC has taken important steps to improve rules related to infrastructure access, our own experience in building new broadband networks demonstrates that more work needs to be done to reduce delays and barriers.

Moreover, "dig once" policies that further promote joint-trenching will continue to reduce barriers to accessing government rights-of-way for broadband providers.

With regard to video competition, owners of popular broadcast and cable content should need to justify alleged volume discounts based on actual costs, allowing for access to content on more reasonable terms by entities other than only the largest incumbents.

Finally, Federal agencies should pursue a balanced approach to spectrum reallocation that allows for licensed and unlicensed commercial uses at a variety of high, medium, and low frequencies. Federal agencies also should explore further opportunities for shared use of spectrum.

A successful policy agenda to increase broadband infrastructure investment and bandwidth abundance will benefit consumers, small businesses and the economy. I thank the Committee for the invitation to speak at this hearing and allowing me to provide recommendations on ways to reduce barriers, give Americans more choices at higher speeds, and help reach the goal of nationwide broadband abundance.