



# GOOGLE FIBER

## Market Implications

### ABSTRACT

Google has introduced Gigabit internet connectivity. This paper discusses why, and market implications

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The “industrialized” world is transforming. The captains of industry are sometimes slowly, and sometimes rapidly transitioning the sustenance level agrarian based societies of the developing world into the industrialized engines of growth first created, and developed by first world nations in the late 19th and 20th century. The so called “first world nations” are experiencing the impact as manufacturing is shifted offshore. Nature abhors a vacuum. As these manufacturing facilities move offshore they are replaced as developed nations embrace their own transition in an explosion of technology enabling an information society. An information society begets a knowledge economy where economic and political production and change are driven by the economic exploitation of information. One of the centerpieces at the forefront early on in this transformation is the search engine company Google. Google has gone beyond the name of a company; its name has evolved into a verb denoting the acquisition and fulfillment of one’s personal desire for information.

Google generates a significant portion of its revenue by a creative advertising scheme whereby marketers can position their offerings as relevant destinations in this search for information. Search drives revenue. Search derives from access to the internet. Search speed is in part a function of the speed that the digital connection offers to the searcher. The more searches made at ever greater speeds drives more eyeballs viewing advertiser’s offerings. As more eyeballs observe the marketer’s offerings, and are influenced to purchase as a result of search, marketers allocate ever greater budgets to search centered upon on-line advertising driving Google’s growth. Google is the medium of information exchange, a repository of information on where to find your desired information. Google cannot exist as an island cut off by time and distance from the world. It is connected to the world by networks outside of its ownership and control. Searchers are linked to Google through the internet, and those searchers internet access is governed by the offerings of their local ISP’s (Internet Service Providers). In the U.S. internet access to consumers is provided by dial up, DSL, cable, and satellite, and wireless 3G and 4G. The primary broadband technologies of DSL and cable are prominent, with mobile access provided by 3G and 4G. Typical speeds in large metropolitan areas generally are in the range of 3 – 7 megabits per second for DSL and 8 – 30 megabits per second for cable. ISP’s have had limited incentives to ramp up access speed in their quasi-monopolistic environment of competition. That is about to change. Google is rolling out, city by city Google Fiber. Internet speeds are promoted at up to 1 gigabit per second. The real focus however, lies in the speed shift by a factor of as much as 100 or more for the typical user (3rd quarter Akamai Technologies, Inc. report results list average US download rate at 9.8 megabits per second)<sup>1</sup>. Speeds approaching 1 gigabit per second opens vast opportunity for the rapid exchange of information at least from the standpoint of a fixed position resource. Why would Google, a search engine giant step into the morass of competing with established ISP’s for network customers?

An article in Time on September 14th, 2012 suggests that Google’s objective is not a head to head competition with the ISP giants of Comcast, Time Warner, Verizon, and AT&T, but an act of public shaming of these legacy giants into improving internet performance. The build out of intermediate size US cities is a proof-of-concept public shaming to demonstrate that better internet performance is possible.<sup>2</sup> It will require an investment of billions of dollars for Google to follow the plan to roll out Google Fiber to a significant portion of the cities that Google has inferred that it has an interest in. That is a rather costly shaming process. Entrenched ISP’s serving those communities will adapt usually by offering similar programs, after attempts to legislate or litigate fail to stop the intruder. However, let’s take a closer look at potential motivations. Currently the US ranks 9th in the world by Akamai’s study

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<sup>1</sup> Akamai's State of the Internet 3Q2013, ed. David Belson, Akamai Technologies, Inc., Cambridge MA, Vol. 6, #3, Section5, p. 21, 2014

<sup>2</sup> Sam Guston, Google Fiber Issues Public Challenge: Get Up to Speed!, TIME, Technology & Media, Sept. 14, 2012, <http://business.time.com/2012/09/14/with-google-fiber-search-giant-issues-public-challenge-get-up-to-speed/>, (Accessed 4/16/2014).

results and 31st in the world by Ookla's Speed Test data aggregation results.<sup>3</sup> Google generates revenue by eyeball exposure to ad media by advertisers when a click through takes place. Naturally the speed of serving up searches enhances ad exposure. There is more here than the immediate  $a = b$ ,  $b = c$ , than  $a = c$  associative concept. Google is adept at gathering data, and analyzing that data. They are aware that technology enhancements suggest that future speeds of 1 gigabit + per second speeds will be the norm. When would be the best time to analyze and learn how society, institutions, and individuals use, apply, and develop new technologies with this leap in magnitude of internet speed? Before it becomes universal, when you can develop the means and methods to exploit your findings before the wave.

Consider Nest, the smart thermostat start up that Google acquired in January, 2014. Nest is a device in entry to the "Internet of Things", an addition to the smart home concept. Why a \$3 billion purchase for the rights to a start-up making inroads into the smart home? Is there value in the knowledge of what you do when you're not on the computer? Are there considerations beyond the obvious in establishing a presence in this market and generating revenue from what appear to be fringe issues? Here's a revenue stream for Nest you might not have seen coming. "The company has negotiated deals with multiple energy partners in the U.S. Some utility partners are willing to spend \$30 to \$50 per year and per thermostat to be able to turn the air conditioner up when it's a hot day."<sup>4</sup> Utilities can level their loads. Some agreements have a split of the cost savings with Nest. Some utilities will provide free Nest thermostats or rebates on an agreement for their use in the home. This is a recurring revenue stream that keeps on giving. Nest maintains the privacy of the individual data under their privacy policy. For access to Nest customers the utility must agree to this limitation where they have very limited to no access to consumer data. According to Forbes this revenue stream will exceed the revenue stream from the sale of the instrument.<sup>5</sup>

Consider Nest and the Internet of Things, and the massive amount of data generated, and the network requirements needed for all of these many devices to communicate to outside networks like Nest which gather and aggregate this data, and package and resell it. Consider Google at the forefront of this information wave, gathering and aggregating consumer data and consumer behavior. Why does Google need a Gigabyte or more network path? Because your refrigerator just informed them that you are out of milk, and the grocer just sent you a coupon on milk amongst other grocer offers to replenish the other items that various networked home devices told Google you needed. Your Google Android based device will assist in ordering all items online for direct delivery to your home. You might consider ordering them with your Google Nexus smart tablet TV controller while you watch TV... while it watches you. What is the product that Google sells? Do you know? The product is you.

Google Fiber was introduced for consumers in Kansas City in 2012. Google Fiber provides a one Gigabit connection to the internet for roughly \$70 USD a month or a five Mbps for no cost. The project was announced in 2010 and the service provided would be 1000 times faster than the basic broadband connections being offered by major ISP's in the U.S. Kansas City was chosen because 'dark' fiber was already preinstalled in some areas and Google decided to buy it. The fiber was installed during the dot-com boom but was abandoned by the original companies after the bubble busted.

When Google fiber introduced fiber to Kansas City, it was an introductory test program. The legacy telecommunication companies did not see Google as a threat. Later the service expanded to

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<sup>3</sup> Ookla Net Index, <http://www.netindex.com/download/allcountries/>, (Accessed 4/18/2014).

<sup>4</sup> Romain Dillet, Nest Uses Its Data To Turn Electric Utilities Into Cash Cows, Tech Crunch, 4/17/2014, <http://techcrunch.com/2014/04/18/nest-uses-its-data-to-turn-electric-utilities-into-cash-cows/>, Accessed 4/18/2014).

<sup>5</sup> Ibid.

Austin, Texas and Provo, Utah. Google officially stated that they are only spurring the growth of competitive platforms, and they are not looking to enter the telecommunications market directly.

The United States broadband speed is ranked 13th globally with the top three considered to be Japan, South Korea, and Hong Kong. Early in 2009 Congress directed the FCC to develop a National Broadband Plan, to ensure that every American has “access to broadband capability.”<sup>6</sup> In a recent broadband survey conducted by Point Topic, the United States ranked 58 out of 90 countries for cost of broadband. According to the survey, the monthly average in the U.S for broadband is around \$89. The high price is also due to the tendency to bundle internet with TV or phone service.

Soon after Google announced plans to enter Austin, Texas, AT&T decided to offer 1Gbp internet connections. The plans are very similar as to Google, \$70 for 1Gbp internet and \$120 for 1Gbp and TV. Time Warner also plans to increase their internet speeds to up to 300Mbps summer 2014. The speed offered by Time Warner before the increase was 50Mbps. While the increase in Time Warner is not the same as AT&T, it is a big boost. An observer would note that the speed increase offering only occurs in the areas where TWC is facing competition.

Google announced in February 2014 plans to expand to 34 new cities across the U.S. In the list released by Google, Atlanta was included with adjacent cities. However, this list is not final and the final decision is dependent on cities’ ability to conduct their own legal work.

AT&T one of the top telecommunication players in the United States, recently announced that they would like to offer Gigabit internet in Charlotte, Chapel Hill and Raleigh-Durham. The interesting part about the move is the fact that Google is planning to offer Gigabit internet in the area too.

Despite all the announcements about Google Fiber and its benefits, companies such as Time Warner still argue that they “are not so sure people want faster service...” Time Warner Cable’s CFO, Irene Esteves spoke at the Morgan Stanley Technology Conference. When asked about the super-fast internet speeds provided by Google Fiber her answer was, “We’re in the business of delivering what consumers want, and to stay a little ahead of what we think they will want...we just don’t see the need of delivering that to consumers.” She further stated that residential customers have little interest in TWCs top internet tiers.<sup>7</sup> This comes as a surprise when 71.7% of the population have access to the internet and 75.6% own a computer.<sup>8</sup> A publication from the Federal Communications Law Review states, “consumers want faster broadband speeds at reasonable prices.”<sup>9</sup> On the other hand, ISP’s and industry associations are satisfied that broadband is being deployed in a “reasonable and timely manner.” The Harvard-Journal of Law and Technology highlighted the pro-active steps taken by San Antonio, Texas in pre-approving a long-term lease for a fiber hut. Such actions stand as a rebuke to ISP and industry associations and demonstrate that the want for higher internet speed exists.<sup>10</sup>

The broadband market today looks much better than it did before Google decided to offer Google Fiber. As of April 2014, Comcast-NBC is trying to purchase another cable company, Time Warner. This combined company would be the largest cable company in the U.S with 30 million customers. While in the attempt to gain approval from regulators Comcast has argued that Google Fiber is a competitor, even when the service currently is offered in a few cities and the announced 34 new cities are not final.

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<sup>6</sup> (<http://www.broadband.gov/plan/executive-summary/>)

<sup>7</sup> (<http://www.theverge.com/2013/2/27/4036128/time-warner-cable-no-consumer-demand-for-fiber-gigabit-internet>)

<sup>8</sup> (census.gov, <http://www.census.gov/prod/2013pubs/p20-569.pdf>)

<sup>9</sup> (<http://www.fclj.org/wp-content/uploads/2014/01/66-1Trogdon.pdf>)

<sup>10</sup> (<http://jolt.law.harvard.edu/digest/telecommunications/san-antonio-approves-leases-for-google-fiber-huts>)

Comcast merged with NBC Universal in 2011 and when seeking approval from regulators they originally argued that TWC would keep them in check to avoid monopolies. The case is, however, that they do not directly compete in any markets.

Verizon Communications overlaps in some markets with Comcast and TWC. Verizon provides a service called FiOS, which is fiber to the home (FTTH). The speeds provided start from 15mbps to as much as 300 mbps. Verizon has the largest number of fiber subscribers in the country, with about 5 million customers. The package costs are \$80 per month with a triple bundle, with speeds nowhere near Google Fiber. However, the deployment has slowed down in the past few years with Verizon arguing that there is a lack of demand. Their CFO has stated, “At this point we have to capitalize on what we have invested.”<sup>11</sup> Instead, Verizon has focused on wireless broadband with LTE technology.

Other regions such as Chattanooga, Tennessee, have built their own high-speed fiber network due to the lack of interest from the telecoms. EPB, a local internet service provider in Chattanooga offers their service for \$70 a month. Springfield, Vermont offers gigabit speed to around 18 thousand customers with federal government assistance. In Chicago, Gigabit Squared plans to offer gigabit internet to the South Side neighborhoods. Other cities where gigabit service is being offered or expected are Mississippi (city TBA by C Spire); Seattle; Sebastopol, California; Burlington, Vermont; Lafayette, Louisiana; Cedar Falls, Iowa; Tullahoma Tennessee; Bristol, Virginia; Wilson, North Carolina; Morristown, Clarksville, Tennessee; East Lansing Michigan.<sup>12</sup>

Overall, a few players dominate the broadband market across the country. Comcast is the top ISP with dominance in 18 states, Cox and TWC both have eight states, AT&T and Verizon have three states, MidContinental controls cable access in two states, and other companies control the rest. MidContinental is co-owned by Comcast, which is why a merger worries the customers and regulators.<sup>13</sup>

Satellite internet is a service that is costly but is the only high speed option to users in more rural areas. The price ranges from around \$50 a month for 10GB, up to \$130 for 125GB of data. Connection speeds range from 10-15Mbps. There are two main players in the market, ViaSat and Hughes. These two providers primary market is where cable or DSL can't reach.

The evolution of services and bandwidth are closely connected. Google Fiber will open the door to a multitude of new devices, applications and content into our daily lives. The European Fiber to the Home Council has provided the idea of a Smart City as having a reliable network as the basis and foundation of applications and services. As this new broadband speed takes us into the future all aspects of our lives will be connected to the internet of things creating unlimited accessibility to anyone, anything anywhere at any time with little or no delay. Our homes, offices, universities and medical institutions will be used in novel ways that seem like science fiction. Although the fiber initiative is still in its infancy Metcalfe's law states that the value of this network will increase with the number of connected users.

Padmasree Warrior is Cisco's Chief Technology and Strategy Officer. At the Silicon Valley Summit in December Mr. Warrior is quoted stating that “We estimate that only one percent of things that could have an IP address do have an IP address today, so we like to say that ninety-nine percent of the world is still asleep.” It is also estimated that by 2020 there will be 30 billion devices connected to the internet. The relationship that users have will their devices generates a large amount of useful content for developers that can be applied to software to enhance the richness of the user experience. Nest Labs

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<sup>11</sup> (<http://www.technologyreview.com/news/510176/when-will-the-rest-of-us-get-google-fiber/>)

<sup>12</sup> (<http://arstechnica.com/business/2013/09/want-gigabit-fiber-home-internet-move-to-one-of-these-cities/>)

<sup>13</sup> ([http://www.huffingtonpost.com/2014/03/04/cable-company-map\\_n\\_4892435.html](http://www.huffingtonpost.com/2014/03/04/cable-company-map_n_4892435.html))

develops smart home appliances that can program themselves and communicate through smartphones. A combination of sensors and other embedded technology harvests information about how you normally do things. This technology already exists for thermostats and lights but imagine for a second the possibilities that a fiber-to-the-home (FTTH) connection could offer in the way of communication to all of your home appliances including the car. Your refrigerator will have the ability to understand all things about the items inside and display images of these contents to your smartphone. In the morning your coffee maker will sync with your alarm on your smartphone to begin brewing at the perfect time. The data-hungry video and voice recognition software applications will thrive on the new life that fiber will provide. High-definition cameras and microphones will be attached to all things and networked. The term “domotics” has been coined from the Latin word “domus” which means home; it literally means home robotics and all Smart Home Technology. Google Fiber provides the capacity for home energy-management, advanced multi-media applications, control systems and security surveillance to enable the home to provide more than just shelter.

Currently businesses are able to connect with a global network of companies from the home or the office. The next stage in collaboration for companies and workers will require FTTH. Very high speed broadband connectivity allows for businesses and employees to use share cloud computing to remotely access heavy-duty enterprise applications. Also Google Fiber will enable companies of all sizes to use secure, private high-quality video conferencing applications. Employees and contractors will be able to meet in real time with parties all around the world. Information will no longer be divided from its users as the fiber connection will allow for instantaneous access to large databases for complex computational programs. Online trading will become increasingly attractive to those who needed a low latency advantage for its investment strategies. In a 2012 survey by Gartner Consulting it is estimated that 75% of companies plan to adopt a cloud computing strategy by 2014. Cloud computing as a platform stands to gain huge advances from high fiber connections. The biggest apprehension for companies to work in the cloud is security however the future can be secured. The server hardware is becoming more affordable with faster processing speed. An enterprise will be able to use its own hardware to create what is known as an “enterprise cloud”. This is essentially a privatized cloud allowing for greater customization, flexibility and most importantly security. The fiber connectivity creates a virtual office experience with employees having the ability to access all of the software and data needed to perform their job from anywhere.

Low-latency, high-quality video conferencing will allow patients to interact with physicians remotely. Fiber will provide a cost-effective IT platform to provide care and monitoring to the growing number of chronically sick and elderly without requiring travel. The availability of consultations while you are feeling ill without having to leave the home is the future of e-health. If your physicians recommends a specialty diagnosis, that is also readily available through the same applications with fiber. Recovery from medical procedures is more comfortable at home and FTTH will allow for virtual check-ups on progress. Image-sensory software can be used and ran over the high speed connection to assess physical rehabilitation movements, track and analyze progress. Large data files such as scans can be shared between doctor and patient over a FTTH connection allowing for diagnosis discussion.

In 2010 Bill Gates spoke at the Techonomy Conference stating that “five years from now on the web for free you’ll be able to find the best lectures in the world. It will be better than any single university”. E-education will take on several forms with the high speed transmission of Google Fiber. Students will be able to hand select the very best lectures from the top university professors in the world. Home school for the youth will gain richness with the collaborative knowledge that fiber will provide. Group projects are challenging when considering schedule differences. Being able to communicate remotely increases the number of meetings thereby increases productivity. With such applications as Google’s Hangout students are able to have video conferences among several members simultaneously.

The advancement in this that fiber brings is high definition quality, screen-sharing advancements and file transfer. While Google Fiber connects more of the world, the pool of shared knowledge grows exponentially providing intelligence as a socio-economic benefit.