

Building Fiber-to-the-Home  
Communities Together



TAP INTO THE MOST VALUABLE BROADBAND RESOURCE AVAILABLE



## Fiber-to-the-Home: Basic Questions and Answers

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### **Q. What is fiber to the home?**

A. Fiber to the home (FTTH) is the delivery of a communications signal over optical fiber from the operator's switching equipment all the way to a home or business, thereby replacing existing copper infrastructure such as telephone wires and coaxial cable. Fiber to the home is a relatively new and fast growing method of providing vastly higher bandwidth to consumers and businesses, and thereby enabling more robust video, internet and voice services.

### **Q. What is the Fiber-to-the-Home Council?**

A. The Fiber-to-the-Home (FTTH) Council, a non-profit association consisting of the companies and organizations that deliver video, Internet and/or voice services over high-bandwidth, next-generation, direct fiber optic connections – as well as those involved in planning and building FTTH networks. The Council works to create a cohesive group to share knowledge and build industry consensus on key issues surrounding fiber to the home. Our mission is to educate the public and government officials about FTTH solutions and to promote and accelerate deployment of fiber to the home and the resulting quality of life enhancements. By that, we seek to ensure that all of America's homes are connected directly into fiber optic networks, which have the superior broadband capabilities of fiber. Our objectives are to supply a consistent and accurate view of FTTH, promote FTTH market development, and to be recognized by the industry as the fiber to the home resource.

### **Q. What is optical fiber?**

A. Optical fiber is a hair-thin strand of glass, specially designed to trap and transmit light pulses. The fiber uses light instead of electricity to carry a signal. It is unique because it can carry high bandwidth signals over long distances without signal degradation. Copper media can also carry high bandwidth, but only for a few hundred yards – after which the signal begins to degrade and bandwidth narrows. Optical fiber has been used in communications networks for more than 30 years, mostly to carry core telco traffic from city to city or country to country.

### **Q. Why is fiber optic cable now being connected directly to homes?**

A. Connecting homes directly to fiber optic cable enables enormous improvements in the bandwidth that can be provided to consumers. While DSL and cable modems generally provide transmission speeds of up to five megabits per second on the download (and are generally slower when uploading), current fiber optic technology can provide two-way transmission speeds of up to 100 megabits per second. Further, while cable and DSL providers are struggling to squeeze small increments of higher bandwidth out of their technologies, ongoing improvements in fiber optic equipment are constantly increasing available bandwidth without having to change the fiber. That's why fiber networks are said to be "future proof."



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### **Q. Why do we need all that bandwidth? Aren't cable and DSL systems good enough for what most people want to do?**

A. If all you want to do is surf web pages, download a few songs, send and receive some photographs, or watch streaming video at current picture quality levels, then the bandwidth provided by today's cable modems and DSL lines is probably good enough. But the world is moving toward vastly higher bandwidth applications. Companies like Netflix, Amazon and Wal Mart are offering feature-length movies for download. More people are looking to upload their own home movies into emails or web pages. Consumer electronics companies are coming out with devices that connect televisions to the Internet. High-definition video is fast becoming the state-of-the-art – and one high definition movie takes up as much bandwidth as 35,000 web pages. All of these applications – and many others we haven't even dreamed of yet – are going to require much greater bandwidth than what is generally available today, even from "broadband" providers.

### **Q. But it was only a few years ago that I upgraded from dial-up to DSL. Are you telling me I'm going to have to upgrade again?**

A. Think about it. A little more than four years ago, the Internet video service *YouTube* didn't even exist. Today, *YouTube* viewers watch more than 100 million video clips a day. It was the advance from dial-up to DSL and cable modem that made *YouTube* possible. And now a growing number of Americans are watching their favorite television programs and news and sporting events over the Internet. We have no reason to believe these innovations will stop. This trend will continue into high-definition video, telemedicine, distance learning, telecommuting and many other broadband applications that have thus far been limited only by the amount of high-bandwidth connections into people's homes. Only fiber to the home can deliver the bandwidth we are going to need far into the future. Fiber to the home providers are now providing this higher capacity at competitive prices.

### **Q. Why can't I get these high-bandwidth applications with DSL or cable modem?**

A. DSL and cable modem rely on copper wire to deliver signals to your home – and copper can deliver high bandwidth only over very short distances. That's fine if you happen to live a few hundred yards from your provider's switching station, but most people don't live that close. Optical fiber distance limitations are hundreds of miles and thus fiber is able to carry high bandwidth signals over distances to nearly all homes and businesses. Only fiber to the home can deliver the immense bandwidth that the applications of the future will require.

### **Q. But I hear that the cable companies are offering new technology platforms that can provide bandwidth of 50 megabits per second and more. So why do we need direct fiber connections?**

A. While cable companies have been upgrading their systems to squeeze more bandwidth out of them, the future is clearly in end-to-end fiber. First, there is no indication that the new cable technologies are going to be able to match FTTH's capabilities with regard to symmetrical bandwidth – that is, upload speeds that can match download speeds. In this era when user-generated content (such as video uploading and "software as a service" over the Internet) is becoming more important to consumers, upload capabilities are going to be critical. There are also questions as to whether the new cable technologies are going to be able to provide the number and quality of HD-video channels that consumers will want in the future. In any case, current FTTH technologies enable telecom service providers are now able to offer many times what even the most robust cable modem technologies will be able to provide in the near future – and the ability to keep expanding bandwidth capabilities is almost unlimited.

### **Q. I've heard that wireless technologies like WiFi and WiMAX can deliver the same kind of service as fiber to the home without having to go through the trouble of installing new wires into homes. Is this true?**

A. No. Wireless broadband is subject to spectrum availability – the cost of which limits the bandwidth, and hence the applications it can provide. These wireless technologies cannot deliver high definition television – and, in fact, they have trouble delivering standard television. And HDTV is only one of the



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many high-broadband applications now being developed for our broadband future. Wireless will always be a useful mobile application adjunct to FTTH.

### **Q. What about satellite? Most people have that choice, don't they?**

A. Satellite offers video, of course, but it cannot offer robust broadband Internet service because the subscriber can only download the signal. Upload is normally provided through the subscriber's telephone lines, which limits transmission speeds for user generated content.

### **Q. Is fiber to the home service affordable?**

A. Fiber to the home services are being rolled out nationwide at prices that are competitive with video, voice and data services being delivered by incumbent carriers over existing access methods. In places where consumers have previously had little or no choice in their video and Internet services, the addition of a fiber to the home competitor has helped keep prices down and lift service quality.

### **Q. How many homes are hooked up directly to fiber networks?**

A. As of April 2009, 4.4 million U.S. homes were receiving video, data and voice services over direct fiber optic connections – with FTTH passing more than 15 million homes nationwide. The number of fiber to the home subscribers rose by more than 50 percent from 2008 to 2009, making the U.S. one of the highest growth countries for FTTH.

### **Q. What percentage of Internet subscribers are getting their service through fiber to the home systems?**

A. The construction of fiber to the home systems began in earnest only in the last three or four years, and as of April 2007 between 3% and 4% of households were connected with fiber.

### **Q. Is there a calculated value of having a fiber-connected home?**

A. Yes. A study by RVA Market Research, a Tulsa based consulting firm, surveyed home buyers and developers. It found that fiber to the home adds about \$5,000 to the purchase price of an individual dwelling.

### **Q. How does the U.S. compare internationally in terms of fiber to the home connections?**

A. South Korea, Hong Kong, and Japan are the world leaders in the percentage of their households that receive broadband services over FTTH. According to the official global rankings compiled by the three global FTTH Councils (North America, Europe and Asia-Pacific), 44% of homes in South Korea are wired with FTTH, followed by Hong Kong at 28% and Japan at 27%. The United States is 8<sup>th</sup> in the ranking with household market penetration of between 3% and 4%. However, the United States is among the leaders in annual growth of FTTH penetration.

### **Q. Where in the U.S. are the fiber to the home subscribers located?**

A. Verizon, the nation's largest provider of fiber to the home service (which it has branded as FiOS), has wired more than 3 million homes, mostly in the Northeast, mid-Atlantic, Indiana, Florida, Texas and California. Dozens of small telephone companies, located mostly in rural areas and small towns, have swapped out their old copper lines with FTTH, thereby enabling them to provide video offerings and compete with cable companies in providing "triple-play" services to consumers. In addition, more than three dozen municipalities and local public utilities across the U.S. have built their own FTTH systems, mostly in areas where incumbent providers would not upgrade their networks. Many developers of planned residential communities are wiring up their new developments with fiber.

### **Q. But, when it comes right down to it, isn't fiber to the home really just a Verizon activity?**

A. While Verizon is the largest provider of fiber to the home services and is making enormous investments in this technology, it is also true that about one third of all FTTH subscribers get their service from small rural telephone companies, medium-sized telephone service providers, cable companies, municipalities and competitive local exchange carriers. In fact, small rural telephone companies are actually leading the way in terms of penetration, with over 6% of their combined customer base now connected via fiber to the home. In all, there are more than 600 providers of fiber to the home service in North America.



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### **Q. Why are municipalities building their own FTTH networks?**

A. Municipalities generally take on the burden of building a broadband network only when they feel their citizens have failed to receive state-of-the-art services at reasonable rates from the private sector. These local governments generally feel that upgrading to fiber networks will vastly improve the prospects for local economic development. In a very real sense, entry by municipalities fills a major gap in the development of these networks, and thus helps to ensure their citizens have access to critical services – particularly in rural parts of the country. The FTTH Council opposes any efforts by states or the federal government to prevent municipalities from building their own networks.

### **Q. What are the regulations on fiber to the home? Do companies have to have government approvals to wire up homes and neighborhoods?**

A. Yes. Because they typically carry video services and thereby compete directly with incumbent cable television providers, fiber to the home providers normally must comply with state and local regulations governing the cable television industry. Most states leave it to municipalities and/or county governments to issue video franchises. And, while federal law requires local governments to allow competition, in many cases the strictures placed on new entrants are too onerous to enable them to take the financial risk of building a new system. Accordingly, a growing number of states (about 20 now) have streamlined their video franchising processes, and it's in these states where the bulk of fiber to the home deployments are occurring. A 2006 study in Texas showed that after that state streamlined its video franchising process, video enabled fiber to the home deployments grew eight times faster there than in the rest of the country.

### **Q. The last time fiber lines were installed in my city, some ten or 12 years ago, the streets were dug up for months. Is that going to happen again as fiber to the home networks are built?**

A. The technology for drilling and burying cable has improved over the past decade. Contractors can now use horizontal drilling techniques, where underground conduits are installed at a single entry point and special equipment runs them to their destinations without having to dig open trenches. Sometimes fiber can be put in existing ducts, water pipes, sewers and gas lines. And many network builders use "aerial" fiber that is installed on poles along with existing telephone, electric and cable wiring.

### **Q. Is fiber to the home primarily a technology for getting high-definition movies on demand?**

A. Not at all. While the vastly higher bandwidth and transmission speeds offered by fiber to the home is certainly enabling video providers to offer a wider range of products and services, users of other applications will benefit as well. Gamers will get access to more powerful multi-player applications. Avenues will open for distance learning and telemedicine. Opportunities for telecommuting and working at home will increase. And, just as Internet applications and solutions have grown more sophisticated with the expansion of available bandwidth thus far, you can be sure that this leap into next-generation broadband will inspire further innovations that we cannot even imagine at this point.

### **Q. What is the "100 Megabit Nation?"**

A. The FTTH Council is a leading voice advocating for a national broadband policy that paves the way for the build-out of next-generation networks. The FTTH Council has called on Congress to adopt a "100 Megabit Nation" policy that would encourage the buildout of high-bandwidth networks and make it possible for all Americans to have access to the Internet at 100 mbps by 2015. In May 2007, Senator John D. Rockefeller IV (D-WV) introduced a resolution calling for a 100 Megabit policy. This was followed in 2008 with a companion bill in the U.S. House of Representatives, sponsored by Rep. Anna Eshoo (D-CA). The Council also has filed comments with the FCC calling on the Commission to update its definition for what constitutes broadband, arguing that the current definition of 200 kbps is not adequate for a nation that seeks to maintain its technological leadership in the world.