

Fiber Gets Faster: The Year of the Gigabit

To support multiple channels of high-definition TV, network providers are flocking to the GPON standard. GePON and Active Ethernet continue to make inroads, too.

By Masha Zager ■ *Telecom Editor*

Putting together this month's deployment roundup, we were struck by the increasing acceptance of GPON, the gigabit-per-second successor to the ITU's BPON standard. GPON isn't new in the passive optical networking (PON) world – it's been around, and in use, since 2003 – but only recently has it been widely used. Many deployers have been waiting for the technology to be proven and for full-rate (2.4 Gbps downstream) GPON to become generally available.

Now that full-rate equipment is available from a large number of vendors (even vendors that weren't originally BPON suppliers), and now that Verizon and even AT&T are beginning GPON deployments, most other deployers have concluded that GPON is ready for prime time. The maturing of GPON comes just in time – network providers need it to deliver high-definition TV without worrying about how many TV sets in each household are tuned to hi-def stations.

But GPON hasn't pushed competing gigabit-per-second technologies off the map. Two others are still very much alive. Gigabit EPON, or GePON, the IEEE's passive optical networking standard, is the leading fiber-to-the-home technology worldwide, though not in the US, and was used in the ERF Wireless deployment featured in this section. Active Ethernet, the third major FTTH standard, supports symmetrical gigabit speeds, and is favored by providers that want to support upstream-intensive applications. As an example, Optical Entertainment Network, which just raised

its offered Internet access speeds to 20 Mbps symmetrical, plans to offer video-conferencing services.

FiOS Rollout Continues

Verizon Communications continued to roll out its massive FiOS deployment, bringing fiber optic Internet service to communities in Florida and television service to Florida, Indiana and Virginia. It also obtained franchises to bring FiOS TV to additional communities in New York, Massachusetts, Pennsylvania, Maryland and Florida.

FiOS TV subscribers will have an easier time searching through hundreds of TV channels, VoD listings, and their DVRs to find what they want to watch. The intuitive interface for Verizon's new interactive media guide, currently being rolled out in most markets, should make it simpler to find video content as well as personal music and photos from the home network. Future versions will add Internet radio, videos, podcasts and games to the platform – an approach that Shawn Strickland, Verizon's VP for video solutions, says "erases the lines between TV, Internet and personal media." Within the next year, FiOS customers will also be able to use cell phones and the Internet to manage their home entertainment.

Second-quarter financial data released by Verizon showed that the company added 167,000 FiOS TV customers during the quarter, bringing the total to 515,000, as well as 203,000 net new FiOS Internet customers, for a total of 1.1 million. FiOS accounted for 70 percent of the company's net increase of

288,000 broadband connections.

FiOS Internet was available for sale to 5.7 million premises in 16 states. Penetration for the service is 19 percent across all markets, compared with 14 percent at year-end 2006. FiOS TV, whose rollout schedule lags the Internet service, was available to nearly 3.9 million premises in 12 states, up from 3.1 million at the end of the first quarter. Penetration is 13 percent across all markets, compared with 9 percent at year-end 2006.

By the end of the second quarter, the FiOS network passed nearly 7.6 million premises, on track with the year-end target of 9 million. With accelerated FiOS customer growth, earnings per share dilution from FiOS was 10 cents, or 1 cent per share less than in the first quarter, and in line with previously announced guidance. Analysts still have mixed opinions about the project, however, with Fitch Ratings reporting that it was "encouraged" by FiOS penetration rates and Pike & Fischer warning of the "substantial financial risks" that FiOS entails.

Municipal Deployments

The Chelan County Public Utility District in Washington State announced a new milestone, with fiber to the premises now available to more than 20,000 homes, businesses, schools and hospitals throughout the county. More than 5,700 subscribers take one or more of the system's services.

The District began constructing the network in 1999, and expects to reach 95 percent of the 40,000 premises in

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ERF Wireless Hits a Hole-in-One with FTTH

A new Fiber-to-the-Home player brings triple-play services to an upscale golf resort in Baja California

Peanut butter and jelly. Bacon and eggs. And now, the list of winning combinations has expanded to include wireless and fiber. Being able to offer both of these technologies may be a competitive advantage, according to ERF Wireless. Founded in 2003, ERF Wireless (www.erfwireless.com) quickly became a major wireless Internet service provider, serving enterprise customers, regional banking associations, municipalities and the general public.

But when ERF tried to propose wireless services to new planned communities, it found that many developers had their sights set higher: While they were interested in wireless, they also wanted to provide services that went well beyond wireless' capabilities. And many of them preferred dealing with a single provider who could install and operate all of the communications services they required.

ERF realized that it had all the ingredients in place to deliver both wireless broadband and fiber-to-the-home, in whatever combination developers needed. In addition to its four

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years of wireless experience and robust back-office systems for network management and billing, it also has FTTH

experience. Its new CEO, Dr. H. Dean Cubley, had founded Eagle Broadband, which built and operated FTTH networks in the Houston market as early as 2002, and several other ERF staffers also had years of experience at Eagle. (Eagle Broadband has now sold much of its Houston-area fiber infrastructure to Optical Entertainment Networks and is focusing on IPTV.)

Tapping this expertise, ERF decided to set up a new triple play FTTH group



The San Jose del Cabo area has attracted many new developments; broadband gives the El Dorado Golf and Beach Club an extra edge.

to market services to greenfield developers. "We believe that greenfield is the low-hanging fruit," Cubley says. "Our customer is the developer with an exclusive community in an area that's beauti-

Optics (www.wave7optics.com) configured in a star topology – what's sometimes called home-run PON or point-to-point PON. (Home-run configurations are most often used in Active Ethernet

with include Scientific Atlanta (www.sciatl.com) for video receivers and converters, Minerva Networks (www.minervanetworks.com) for IPTV middleware, and X-Analog Communications (www.x-analog.com), which will be providing key components including satellite head-end functionality.

Once the basic systems are in place, additional network applications may be added, such as video surveillance and other security features. ERF is still in discussions with the developer about the final list.

ERF is also moving full steam ahead to bring in additional FTTH projects, and has bids out for a number of developments in the US and abroad. Between its new FTTH business and a major wireless banking project that's in the works, ERF is projecting revenues of more than \$10 million in the next 12 months, compared to \$1.7 million for all of 2006.

The mix of wireless and fiber experience may be critical to winning these FTTH bids, some of which call for blanketing all outdoor areas with wireless. "We believe we can provide one-stop shopping for [developers] – fiber, video, wireless, security and any other aspect," Cubley says. **BBP**

ERF is using a GePON system from Wave7 Optics (www.wave7optics.com) configured in a star topology – what's sometimes called home-run PON or point-to-point PON.

ful but has no services. This combination is perfect for a fiber-to-the-home platform to provide turnkey services."

The new group has been fully operational since late last year. This May the company announced its first FTTH project: an agreement with the El Dorado Golf and Beach Club, an exclusive gated community in San José del Cabo, Mexico, to provide a complete voice, video and data system. The network will deliver services to the entire development, including the private club and all of the multimillion-dollar homes in this seaside resort at the southern tip of the Baja California peninsula.

The El Dorado's golf course is already open, and the developers are now building about 200 new high-end homes there in addition to restaurants, shops and other amenities. About 50 homes are expected to be occupied by the end of this year, and the community should be fully built out in about three years.

The initial design and development of the FTTH network, which is to cost more than \$2 million, is already underway, with completion projected by the end of this summer. Contracts for follow-on maintenance and operational support are also being developed, and are expected to generate additional recurring revenues for ERF Wireless over a multiyear period. However, the developer, rather than ERF Wireless, will own the fiber plant and facilities, and will be the service provider for the community.

To deliver the FTTH services, ERF is using a GePON system from Wave7

networks, but are becoming increasingly popular with PON, especially in greenfields.) This dedicated fiber connectivity will deliver an astounding 155 Mbps of bandwidth to each home – enough to support VoIP telephone service, high-definition and standard-definition video over IPTV, and very high-bandwidth Internet connections. The developers are betting that owners will be more willing to buy houses at El Dorado, and will spend more time there, if they have sufficient bandwidth to telecommute easily. Wireless access – including wireless LANs in the homes – is a small component of the El Dorado system.

Other vendors that ERF is working

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the county by 2012. A total of 15 retail service providers offer various combinations of high-speed Internet, television and telephone service over the network.

Connexion Moves West, OEN Ups the Ante

Connexion Technologies, the North Carolina-based developer of fiber optic networks, has done most of its work in the southeastern states. This month, it announced another new project in Florida – The Plaza on Brickell, an upscale high-rise in Miami, in partnership with The Related Group. In addition, Connexion took a geographic leap west with two Arizona projects: Livingston Ranch, a single-family community in the greater Yuma area (Kammann Development) and Tuscan Villas at Painted Mountain, luxury town homes in Mesa (Mehan Construction).

Recently, Connexion announced that it had selected Alcatel-Lucent's GPON solution to offer voice, video and data services to 20 master-planned communities. (Later in this issue we feature a more in-depth look at Connexion's design strategies.)

Houston-based **Optical Entertainment Networks**, which launched its FTTH network earlier this year with 10 Mbps symmetrical Internet access, announced that it was raising its maximum bandwidth to 20 Mbps in each direction – not the fastest Internet service in the United States, as it claims (Paxio offers speeds up to 1 Gbps) but well above what most providers, even FTTH providers, are offering.

International Deployments

The European Commission approved a proposal by **Sicoval**, an association of municipalities in southern France, to fund an open-access FTTP network that would serve businesses and public agencies. The EC has strict rules limiting municipal broadband services, but approved this network because it found that businesses in the area did not have access to adequate, affordable broadband services. The new network will be built and operated by a consortium consisting of Marais Contracting, Vinci

and Alcatel-Lucent.

Alcatel-Lucent scored another win in France with national telecom operator **France CitéVision**, which will deploy a GPON network in the town of Amiens, north of Paris. France CitéVision plans to deliver ultra-high Internet speeds as well as high-definition TV, VoD and other interactive services. Alcatel-Lucent will also provide its IP/MPLS service routing solution along with project management, installation and commissioning, and maintenance. Initial deployments will begin in the third quarter 2007.

In Cyprus, **CYTA**, the leading opera-

tor, will be deploying a pilot FTTH network based on Ericsson's GPON solution in order to provide high-definition TV (up to two channels per home), games, on-demand services, VoIP, and possibly surveillance and security services. The contract includes central office equipment, customer-premises equipment and passive infrastructure such as fiber systems and cables. In addition to the GPON network, CYTA will also be trialing a point-to-point network using Ericsson's switches and customer-premises equipment.

Swiss cable operator **Stadtantennen AG** is making the jump to fiber, deploying Terawave GPON products

INDEPENDENT TELCO DEPLOYMENTS

Independent telephone companies are bringing the benefits of high-speed networks to businesses, beachfront developments, and residents of small towns

- **ATMC**, the North Carolina ILEC whose greenfield fiber deployments we featured in the April issue of BBP, announced its latest deployment, Calabash Lakes at Carolina Shores, a community being built by Portrait Homes. The Calabash Lakes Community has the potential for up to 750 homes on the 162-acre property; two model homes have already been completed and are currently being served by ATMC with triple play services over fiber optics.
- **Blue Valley Tele-Communications**, a telephone coop in Home, Kansas, is migrating its network from BPN to GPON in order to provide IPTV service to its customers and increase Internet bandwidth. The coop is using fiber technology from Tellabs, including the 1150 multiservice access platform and the 8830 multiservice router. Tellabs Global Services helped Blue Valley plan and build its new network and integrate the new technology with its existing equipment.
- Canadian telco **Bruce Telecom** is reported to have begun construction of a FTTH network in Southampton, Ontario, where it currently has about 800 Internet customers and 400 telephone customers.
- **Centennial de Puerto Rico**, a CLEC that is the commonwealth's second largest telecommunications service provider, is expanding its fiber-to-the-business network with Occam Networks' Broadband Loop Carrier system, including Session Initiation Protocol (SIP) voice functionality. Centennial maintains more than 400,000 lines and provides wireline, wireless and broadband data services in Puerto Rico and in the US Virgin Islands, as well as wireless service in parts of the Midwest and South. Centennial deployed Occam's Active Ethernet equipment at the central office and customer premises, including optical line terminal blades, optical packet transport blades and optical fiber network terminals.
- **Prairie Grove Telephone Company**, an Arkansas telco, is planning to upgrade its network to Active Ethernet, and is also using equipment from Occam Networks. Deploying a combination of fiber, DSL and T1 CES blades on a 10-gigabit backbone network, Prairie Grove plans to bring ultra-high bandwidth to 100 percent of its customer base within five years. Prairie Grove serves approximately 10,000 subscribers with voice and broadband today, and plans to offer video in the future.

in several multiple dwelling units in Baar, Switzerland. The deployment was managed by Broadband Networks AG, a leading system integrator in Switzerland. Stadtantennen installed a Terawave TW-800 GPON Optical Line Terminal in its hub site and a TW-148 Optical Network Terminal in each of the 6-unit apartment buildings, providing 10/100/1000Base-T triple play Ethernet-based services. Rolf Jung, Stadtantennen's CEO, calls GPON "a significant evolution of our triple play infrastructure from traditional hybrid-fiber coax" and says Terawave's system is well suited to cable operators because it provides a variety of options to address differences in subscriber needs and subscriber density. **BBP**

Vendor Spotlight:

Alcatel-Lucent.....	www.alcatel-lucent.com
Ericsson	www.ericsson.com
Marais Contracting.....	www.samarais.com
Minerva Networks	www.minervanetworks.com
Occam Networks	www.occamnetworks.com
Scientific Atlanta	www.sciatl.com
Tellabs.....	www.tellabs.com
Terawave.....	www.terawave.com
Vinci.....	www.vinci-construction.com
Wave7 Optics	www.wave7optics.com
X-Analog Communications	www.x-analog.com

Deployer Spotlight:

ATMC.....	www.atmc.com
Blue Valley Tele-Communications	www.bluevalley.net
Bruce Telecom	www.bmts.com
Centennial de Puerto Rico.....	www.centennialpr.com
Chelan County Public Utility District	www.chelanpud.org
Connexion Technologies	www.cnxntech.com
CYTA.....	www.cyta.com.cy
France CitéVision	www.france-citevision.com/home.php
Optical Entertainment Networks.....	www.fision.net
Prairie Grove Telephone Company	www.pgtelco.com
Sicoval.....	www.sicoval.fr
Stadtantennen AG.....	www.stagbaar.ch
Verizon Communications	www.verizon.com