

Three Independent Telcos Tell Tales of Fiber

In the FTTH Conference Independent Telco panel, representatives from EMBARQ, Comporium and TELUS Communications shared their experiences building fiber to the home and discussed lessons learned. The panel was moderated by Billy Pyatt, VP of sales and marketing at Corning Cable Systems (www.corningcablesystems.com).

EMBARQ (www.embarq.com) is an independent telco spun off last year from Sprint Nextel. Operating 17.5 million lines in 18 states, it serves both urban and rural markets. Stephen S. Carter, EMBARQ's VP of network planning, said the company has been building fiber-to-the-home networks in green-field developments since 2003, a decision made based on long-term total cost of ownership. Currently it has passed 21,000 units with fiber in nine developments, and is serving 1,600 customers. Another 28 new developments are planned, with 34,000 homes projected to be passed at total buildout.

Because neither the individual projects nor their total volume have been large, EMBARQ has not been able to achieve economies of scale. But it has looked hard for opportunities to reduce deployment costs. Its biggest pricing issues, Carter said, concerned splicing and ONTs (optical network terminals – the boxes outside the customer's house that terminate the fiber lines). Since its early deployments, the company has greatly reduced the number of splices it was doing. It has also benefited from the reduction in ONT costs.

Another challenge EMBARQ faced at the outset was the lack of fiber feeder plant – a necessity for providing any kind of high-bandwidth network. Adding feeder capacity has been an expensive proposition, Carter said.

Because of EMBARQ's large and varied service area, there is tremendous

variation in the types of homes being built, which range from “random builds” to master-planned communities to high-rises. Each FTTH network the company builds has unique technical and business considerations. For example, battery backups might be placed in basements in the Midwest, while in the South and West they are more likely to be placed in garages.

Until early 2007, the company's approach to FTTH was haphazard and not well standardized, according to Carter. In March, it launched a new strategy of using FTTH in all bulk new growth. Within 10 years, all developments of 50 units or more will be served with fiber.

EMBARQ found that the average capital cost per home was about equal for all-copper and fiber-to-the-node networks, while FTTH came in slightly higher. FTTH was still usually less expensive because the company could avoid placing customer-premises equipment without a customer order.

With fiber becoming more strategically important, EMBARQ decided to standardize its FTTH technology as follows:

- BPON electronics
- Electronics kept inside the central office where possible; dedicated connection from fiber distribution cabinet to the subscriber
- Cables connectorized on both ends
- Fiber drop and ONT are not installed until the customer places an order.

In partnership with Corning, the company undertook cost studies of

competing technologies to decide where FTTH made the most economic sense. Using a typical subdivision as an example, the study found that the average capital cost of delivering service to a home with all-copper or fiber-to-the-node networks was about equal – \$1,107 and \$1,108 respectively – and FTTH came in a little higher, at \$1,181. However, FTTH was still usually the less expensive solution because the company could eliminate the DSL modem and avoid placing any customer-premises equipment without a customer order. The biggest remaining issue in new developments is EMBARQ's lack of fiber feeder cable, which can tip the balance toward copper. However, the company

is trying to build out more fiber feeder cable wherever it can.

EMBARQ is not yet overbuilding with FTTH, but where feasible it is building fiber to the curb in brown-field areas, in preparation for eventually bringing fiber all the way to the home.

Comporium (www.comporium.com) has a long history as an ILEC in South Carolina, and has expanded through acquisitions. It also operates as a CLEC and a cable provider, and has been in the video business since 1964. It started building FTTH in 2004, in an effort to avoid operating parallel phone and cable networks.

Eric McCall, an outside plant specialist from Comporium, explained that when the company reviewed all of its options for single networks, it concluded that fiber was the best option. DSL would have been “a step backward,” McCall said, because it couldn’t have met the bandwidth demand fueled by new applications and by customers’ desire to have the same capacity at home that they were used to in the office. Consolidating the networks on HFC would have required the company to keep splitting the cable and to keep building fiber further and further out.

Fiber, on the other hand, was a permanent solution and would reduce the company’s maintenance costs. As a further incentive, Comporium had to respond to a cable operator that was competing for business in a greenfield development in its service area, and wanted to come to the developer with a better offering.

As of September, Comporium has brought fiber to 75 new developments, passing 9,667 lots and 3,711 completed homes. Eighty-eight percent of homes passed take at least one service; video and data are more popular in the suburban areas, while voice is the most popular service in the rural areas. Video and broadband take rates are much higher for fiber than for the areas served with cable. In addition, the company provides 1 Gbps service to schools and businesses. It hasn’t yet made a decision about bringing fiber to brownfield residential areas.

Comporium started out with a point-to-point topology that mirrored that of the copper plant and was considered easier to train technicians on. Later, the company added splitter cabinets for better fiber management, and succeeded in reducing costs.

In 2006, when the engineering department was requested to justify its use of FTTH, it performed new cost studies and re-evaluated its approach. It found that in the two years since it first began using FTTH, fiber had become much more economically competitive: The cost of bringing fiber to a home had fallen by 5 percent, while the cost of bringing copper to a home had risen by 2.5 percent.



All fiber is not the same. EATEL marketing material helps clarify the FTTH versus hybrid fiber-coax issue.

In November 2006 Comporium published a set of installation engineering standards, which specified, among other things, the use of multipart terminals in pedestals to reduce the number of splices and vaults, and single-ended connectorized drop cables. Some issues, such as powering the equipment at the home, are still unresolved.

TELUS Communications (www.telus.com) serves more than 10 million wireless and wireline customers in Western Canada with voice, video and Internet. It is currently building FTTH networks in both greenfield and brownfield areas.

Sheldon Sitter, GPON Build Program Manager at TELUS, said the company has already done a massive buildout of ADSL2+ to the urban communities in its service area and is using VDSL2 in high-rises. Its commitment

to fiber is more recent, but it plans to use fiber in all greenfield builds as soon as possible. In brownfield areas, the cost of direct burial of fiber cable is “astronomical,” Sitter said, so TELUS places fiber only where there is aerial plant or existing conduit that it can use.

TELUS’s business model balances revenues against capital costs and operational savings. In FTTH networks, capex is substituted for opex (fiber is somewhat more expensive to install and less expensive to maintain).

The company has standardized on 2.4 GPON with a 1x32 centralized split. Its cost models indicate that splitters in the field are too expensive because of the labor costs involved in getting people out to the field to install and troubleshoot equipment.

TELUS’s goal is to provide burstable 1 Gbps and sustainable 80 Mbps down-

stream and 40 Mbps upstream. In the central office, it uses 4 PONs per card with 10G to the backplane and a 10G uplink for each card.

In the field, the company uses small splitter cabinets placed on poles, pads or minivaults. The rear-access cabinets are prestubbed with cables. The first cabinet TELUS tried was difficult to rout cables in; after a redesign by the vendor, fiber legs now hang down where they can be easily pulled and rerouted. Fiber can be “parked” for homes passed that have not yet subscribed.

Passive splitters are interoperable with the fiber distribution hubs. The robust, snap-in electronics allow TELUS to add customers even in -40 degree weather, a major consideration in Canada. The splitters can be replaced later with 2x32 splitters in the same form factor if the company decides to increase bandwidth.

In brownfield areas, TELUS uses factory-installed terminal systems, which have tails to allow for the occasional mismeasurement. “They’re scary,” Sitter said, “but we haven’t had any problems with them.” These have reduced the amount of splicing needed, and shifted the workload to system design. For underground plant, TELUS uses laser range finders or measuring tape to measure the cable; it places the tape in the conduit, and uses the same tape to pull the cable. Measuring wheels aren’t accurate enough, Sitter said.

For drop cables, Sitter prefers flat, self-supporting, single-end connectorized cable so that installers don’t have to manage a lot of slack. Traditional splice closures are used in direct-burial situations.

ONTs are placed on the outside of the houses without electronics in them, allowing TELUS to defer the cost of the electronics until the customer is ready to activate service. Using separate electronics also allows for the separation of labor (lower-skilled workers placing the box on the house, higher-skilled workers hooking up the electronics) and makes repairs easier. The battery backup is placed indoors, only because the weather is so cold.

With the increasing use of the Web for healthcare information and services, online health ad spending is projected to increase to \$662 million in 2010. *Wall Street Journal, 3/21/06*

More consumers getting increasingly involved in the healthcare decisions for their families, and looking online for assistance. **Players:** Google, Yahoo!Health, WebMD, Revolution Health

More consumers going online for healthcare medication information. 37% of US residents who use the Internet number of visits to health-related sites increase from 2005 to 2006.

Health Help Desk
Consumers use the Internet to make health decisions for themselves, others

Self	44%
Others	56%

The Cash Track
Consumer use online, personalized systems to track health care spending

Personalized systems	44%
Traditional systems	56%

Stages of Health Provide the Framework for Future Models of Care in the Home

Health Stage	Wellness (Pre-incident)	Acute Health Incidence	Post-Acute Health Incidence	Chronic Health Incidence
Setting	Home Community Physician's office Outpatient service sites	Hospital Emergency rooms Inpatient settings Outpatient service sites Physician's office Home	Home Independent living Assisted living Nursing homes Transition care Physician's office Outpatient service sites	Home Independent living Assisted living Nursing homes Physician's office Outpatient service sites
Functions	Education Self-monitoring Self-management Screening Treatment			

Rob Scheschareg, founder of Intuitive Care Advisors, and Jason Knott, who edits CE Pro and TechHome Builder, noted that the market for online health information is exploding. They said developers should focus on specific lifestyle changes brought on by health problems, or anticipated by consumers as they age. This would facilitate sales of bundled wellness services such as a personal health portal, aggregated health content, and partnerships with local care providers.

New Home Technology Penetration

Technology	2006	% of Builders Offering	Consumer Pricing
Structured Wiring	53%	87%	\$3,800
Monitored Security	32%	81%	\$2,000
Multi-Room Audio	16%	74%	\$2,800
Home Theater	12%	73%	\$7,700
Lighting Control	8%	57%	\$6,900
Home Automation	6%	51%	\$8,900
Energy Mgmt.	11%	52%	\$2,400

Source: CEA, NHB

Consumer Electronics Association data presented by Rob Scheschareg and Jason Knott show what buyers want and how much buyers are willing to pay for broadband-related home technology. The data are from 2006.