

# Visions of the Network of the Future In Orlando

The Fiber Broadband Association – formerly the FTTH Council – broadened its technology base but its conference emphasized fiber to the home as the ultimate goal.

By Steven S. Ross / *Broadband Communities*

**A**ttendees at the Fiber Broadband Association’s June annual meeting in Orlando, Florida, glimpsed the Network Future:

- Billions of connected devices. Comcast’s Mike Slovin, vice president of national sales for XFINITY, said 3 billion devices are connected to U.S. networks. Cisco expects 25 billion worldwide by 2020 – two-thirds of them wireless. These will include driverless vehicles connected mostly with 5G wireless along the roads.
- Access networks that quickly and automatically reconfigure themselves to meet demand and emergencies
- Low latency along with high bandwidth
- New ways to bring good broadband to rural areas and urban dwellers caught on the wrong side of the digital divide.

The Network Present is already great for some:

- Cities gain new vitality as young workers chose not to live in sterile suburbs. Said Rocket Fiber’s Mike Hudson, “Young kids don’t want to look out over a suburban parking lot.” Rocket’s sister company, Quicken Loans, now has 15,000 employees in downtown Detroit.
- Fiber is supplemented by point-to-point wireless, G.fast and DOCSIS.
- Equipment vendors become software companies as equipment becomes cheap and commoditized.

But the ghost of Network Past still clanks its chains:

- Regulatory muddle as telcos and cable companies increasingly converge but are regulated differently
- Federal loans for suburban overbuilds rather than for rural areas with little or no broadband access
- Confusion over net neutrality
- Lack of political will to deliver good broadband to the one in five Americans without access to it now
- Unwillingness of network deployers to share physical networks even though today’s technologies overcome every technical reason for not sharing.

## FTTH GROWTH STILL STRONG

Speakers were quick to note what can be and is being accomplished. Mike Render of RVA LLC said 2016 was a banner year for FTTH deployments in the United States – 16 percent year-over-year growth in homes passed and marketed, to 30.4 million, and 13.7 million connected. Homes passed in Canada grew 18 percent in 2016. In North America as a whole, fiber now passes more than 40 million homes.

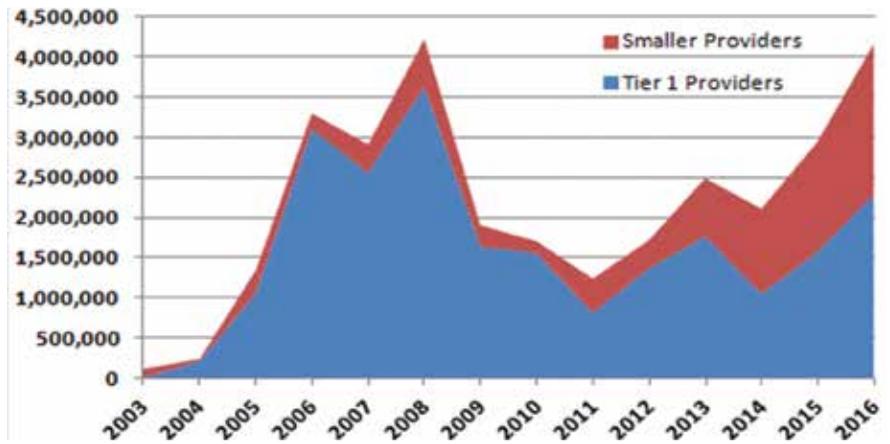
Almost half the U.S. 2016 FTTH growth (close to 2 million homes marketed) came from smaller carriers. Tier-1 carriers accounted for just over 2 million newly marketed homes. The smaller carriers’ share has been growing since 2010 and is now poised to overtake the majors.

Render predicted 2017 will set new records for fiber deployment in both the United States and Canada.

### LARGE FIBER COUNTS

Kevin Bourg, optical network architect at Corning Optical Communications, said that increasing fiber counts by 15 or 20 percent will add only 5 percent to the cost of a network but will increase revenue potential by 15 to 50 percent and make software-defined access (SDA) faster, more capacious and more reliable – especially in networks served by NG-PON2 and the still-in-progress 100G-EPON, which promise to reassign wavelengths on the fly.

Korea is using large fiber counts to densify its 4G cellular networks in preparation for 5G and for the Seoul Olympics, at which hundreds of thousands of attendees will be expected to livestream at once. The extra fiber goes mainly to small-cell hot spots. Bourg noted that businesses ask for



Annual number of homes marketed by type of provider. More than 1,000 smaller FTTH carriers are coming close to matching deployments by the major carriers. Source: Michael Render RVA LLC.a

redundancy, and if business managers worry about fiber cuts, they have to pay for the redundant infrastructure.

Bourg said the Corning model can price out at \$900 per home passed, plus \$600 per home connected with a 1x64

split, deployed to 100,000 homes with a 40 percent take rate. NG-PON2, using all available wavelengths, is capable of 80 Gbps symmetrical speeds, so this type of deployment would give every home more than a gig.

**STEP 1**

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- ✓ Survey the community
- ✓ Set fiberhood take-rate targets
- ✓ Sign up customers before build-out
- ✓ Build where take-rate targets are met
- ✓ Deploy incrementally based on ROI
- ✓ Real-time data from YOUR customers

**Fiber-To-The-Home TOP 100**  
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**STEP 2**

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Left to right: Randy Klindt of OzarksGo in Arkansas; Carl Meyerhoefer of Calix, biggest supplier to rural carriers; Fritz Amt, CommScope; John Claffey, RUS; James Gresham, Ervin Cable Construction; Jonathan Chambers, Conexon

Kurt Raaflaub, head of global product marketing at ADTRAN's carrier networks division, noted that the European Union's 2020 goal is ubiquitous 100 Mbps, followed by 1 Gbps in 2025. He said ADTRAN has 100 G.fast trials underway, using the ONOS open-source SDA operating system.

## CALLING ALL CO-OPS

Jonathan Chambers, a former FCC official, chaired a panel on fiber deployments by rural electric co-ops. Nationwide, the 850 electric distribution co-ops have 44 million customers and serve 75 percent of the U.S. land area. According to Chambers, co-op footprints typically surround small towns and cities that have some, but not good, broadband service, so co-ops could conceivably serve a third of the U.S. population with broadband.

Chambers insisted, "It is feasible economically to build fiber to anyplace that has an electric line. The FCC was and is opposed to this idea, but cooperatives are putting it into practice." Co-ops are natural candidates for rural broadband provision because they can take advantage of their existing infrastructure.

Randy Klindt, Chambers' partner in Conexon, a firm that helps guide co-ops, showed the possibilities. Klindt heads OzarksGo in Arkansas, which is now building what he thinks is the largest rural co-op fiber network. "It's the only electric co-op to deploy 100 percent FTTH to subscribers," he said.

"We have 15,000 customers [after the first] year, about three years ahead of schedule. We average eight customers per mile and sell 100 Mbps for \$49.95. We pass about 50,000 [electric] meters ... with no government grant."

Chambers said he and Klindt have worked on possible broadband plans with 50 co-ops in the past year. One such project was denied ARRA funds but solicited support from its members, only 19 percent of whom had access to broadband. The co-op's 30,000 members will need to invest \$80 to \$90 million to move ahead.

Chambers said the business case works with five to eight members per mile. He recommended building a fiber network to overlay the co-op's electric grid and keeping fiber counts low with distributed taps, splitters and small hubs. Chambers urged co-ops, "Tell members they are building fiber to 100 percent of the membership. In order to do that, you have to serve more-dense areas. If you partner with a telco, they are already in the more densely populated areas, but you need that revenue, too."

Co-ops have a tough time financing FTTH builds, but funding is available for smart grids. The Rural Utilities Service can make 25-year loans for fiber used in smart grids. The National Rural Utilities Cooperative Finance Corporation (CFC) and Cobank may be able to lend money where RUS can't, according to Jonathan Claffey, policy adviser in the RUS electric program. He noted that joint financing with these agencies is possible because "RUS has longstanding mortgage agreements with them." Chambers and Claffey both noted that co-ops can partner, but that ideally, co-ops, rather than their telco or municipal partners, should own the fiber.

## New Technology from Fiber Connect Exhibitors

Smaller, lighter, less expensive – fiber networks have never been easier to deploy or to justify. Here are some examples of how the industry makes it possible.

As bandwidth needs increase, fiber and the systems for distributing it in inside and outside plant get physically smaller. They also become less expensive to deploy, even as fiber counts increase.

Clearfield, Corning, Preformed Line Products, OFS and others showed refinements of smaller hubs and splitter and drop enclosures that take advantage of ever-thinner fiber cables. For buried as well as aerial

fiber, Emtelle QWKlink (part of the QWKconnect line) has 1.1mm fiber preconnectorized with SC and LC connectors for small ducts – even microducts. The fiber is sold in 25-meter increments up to 500 meters long. This approach allows connecting fiber without splicing from the street to customers' homes.

Ditching equipment is getting smaller as well. Ditch Witch

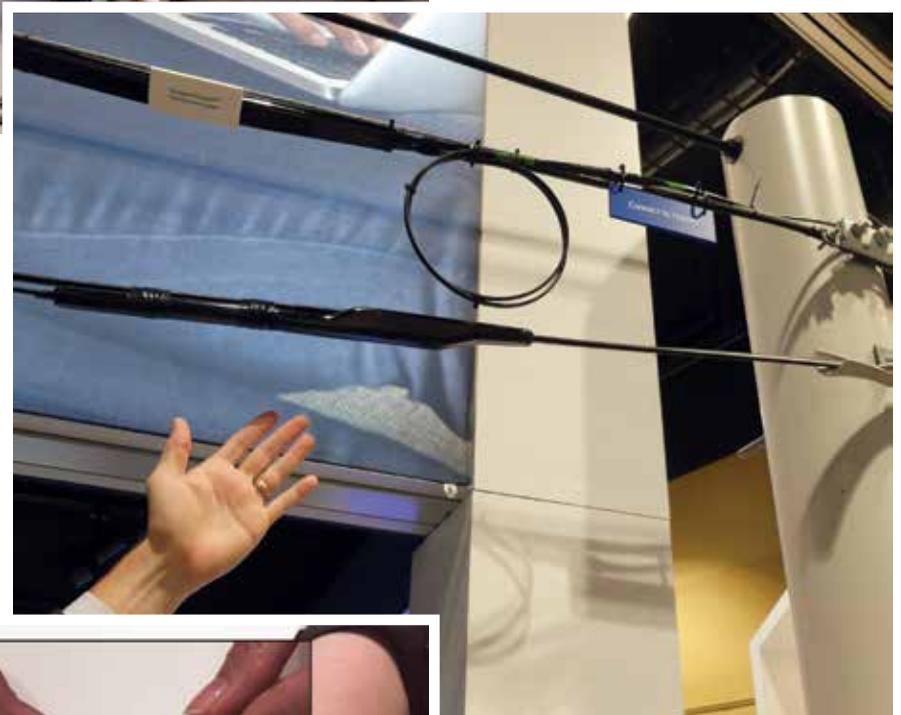
introduced a new, inexpensive walk-behind trenching machine, joining Trench'n Edge, which exhibited its similar machine at the **BROADBAND COMMUNITIES** Summit. These tools make it easier for small communities and property owners to deploy and maintain fiber systems. ❖

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Corning's compact, pole-mounted, OptiTect MC series local convergence cabinet is designed to handle the first level of splitters from the central office to customers. It includes pass-throughs for easy handling of unsplit fiber for wireless towers or heavy business users.

Corning's FlexNAP now accommodates preterminated RPX ribbon cable for connecting the last jump from pole to premises (the fiber loop in the picture). Like many recently introduced products, this allows the same basic fiber building blocks to handle distributed and centralized splits and home-run fiber. It makes splices unnecessary even when a local distribution cabinet or hub is in the mix.



3M added to its line of simple connector tools with its Crimplok+ activation tool for fast field termination of 250 and 900  $\mu\text{m}$  single-mode fiber without a splice, gel or adhesive, using SC/APPC connectors. These connectors use a metallic element that mechanically locks the fiber strand to the termination. The little plastic cap (see inset) sets exactly the right protrusion length for the fiber inside the connector. The protrusion is then polished with the orbital mechanism shown at upper left. One turn of the crank does the job. The tool comes stand-alone or packaged with a 60-pack of connectors.



Additional images are available in the digital edition of this article at [www.bbcmag.com](http://www.bbcmag.com).