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# Tech Workshops: Home Networking, Upstream Capacity And Doing The Splits

A hybrid solution that includes Gigabit Ethernet, MoCA and Wi-Fi (both 2.4 GHz and 5 GHz) could be the best way for cable operators to provide a carrier-class home networking solution, says Chris Albano, senior director/CPE and home networking at Comcast.

"Between the three, develop a synergy to best meet the new devices that come into the home," he added during yesterday's "DOCSIS 3.0, Back to the Future: Optimizing Whole-Home Networking and Migrating to Higher Speed Upstream" technical workshop.

Comcast ran a series of tests at DOCSIS cable-modem speeds of 60 Mbps and found, not surprisingly, that Gigabit Ethernet provides the most reliable and fastest Internet connection. Here's the problem, he says: It's not easily accessible everywhere in the home.

MoCA, on the other hand, delivers 60 Mbps while using existing coax.

"The whole world is moving to MoCA. We at Comcast have made the decision that all new products will have MoCA embedded into them, but (you) must really understand and characterize how MoCA, which is enabling our new devices, interacts with old legacy stuff," Albano explained. For example, some older devices cannot withstand the burst of MoCA energy. Comcast solved this by lowering the MoCA beacon to 40 dBmV. The alternative - putting MoCA filters in front of the devices - would not be operationally cost-effective when millions of homes are taken into account.

"And everyone is moving toward building MoCA in new devices," Albano pointed out. "When you put MoCA (filters) in a home, you would be blocking MoCA energy and the home networking revolution."

**Flexing Wi-Fi**

Despite the reliability of Ethernet and MoCA, consumers are going to want the flexibility that Wi-Fi offers in their home network, Albano said. Comcast found that 5 GHz Wi-Fi offers great throughput close to the access point,

approximately within 30 feet. Any farther away, however, and performance begins to drop. Alternatively, 2.4 GHz has greater range but more interference, because most legacy wireless devices operate only at 2.4 GHz.

Question: Why not boost the number of antennas? Answer: Because the average home of 2,000 to 3,000 square feet will not need a 3x3 antenna configuration.

"You will be lighting up the front lawn when no one is out there. There will be embedded technology in the device that is not being used," Albano said. "Give out 2x2 to everyone, and use MoCA extenders for those people in really big houses."

**Increasing Upstream**

Hand in hand with home networking, interactivity has become a way of life as people are changing from consumers of information to producers of it, said Jeff Finkelstein, senior director/Network Architecture at Cox Communications.

Here are some interesting stats forwarded by Finkelstein at the "Access Network Challenges: Cost Per QAM and Return Path Bandwidth" tech session: The average employee generates 5 Mbps of data per day. More than 415,000 videos are uploaded to Facebook daily, and YouTube gets 20 hours of video per minute.

"Technology starts in early stages with those who are tech savvy, and it migrates to more mainstream customers," he continued. "Our job is figuring out where in the swing we are before it becomes mainstream because it takes a while to add capacity."

Dean Stoneback, senior manager/Systems Engineering at Motorola, who spoke on Albano's panel, estimated that in six to seven years, operators will run out of bandwidth for the return path.

"It is clear that, sometime in the next five years, something is going to have to be changing, and now is the time to plan," he suggested. "There are many choices, but operators don't like any of them because they cost money and there is no added revenue."

Out of several options – node splits, mid-split (extending the outer edges of the band to 85 MHz from 42 MHz), high-split (extending all the way to 200 MHz), top-split (moving the return path to above 1 GHz), RFoG and PON – Finkelstein said the mid-split is the most likely option that will be pursued…at least initially.

It is “conceptually simple” to change the split to between 5 MHz and 85 MHz. However, the operator would need to touch every node and amplifier in every area. In addition, many lasers will need a new filter to keep the higher frequency signals out of the return path, he added.

The silver lining? An operator could do the prep work for migrating to 1GHz while touching the amps anyway.

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