

Another Detour for Rural Residents

Welcome to the world of white boxes (for the haves) and white spaces (for the have-nots).

By Steven S. Ross / *Broadband Communities*

What will historians make of a year in which major national carriers gobbled up content providers and, after years of fighting the FCC on net neutrality, decided they could simply redefine it instead? A year in which the White House took six months to add broadband to its list of infrastructure worthy of construction, but the FCC summoned a large group of legal, technical and political minds to a Broadband Deployment Advisory Committee (BDAC) to devise ways to streamline network deployment rules without bigly annoying existing large carriers?

A year in which equipment vendors came close to completing their transformations into software companies, leaving the manufacture of most fiber and copper electronics, even the most advanced models, to a few big players like Nokia and Huawei and to nearly anonymous factories? In which a few nimble, smaller players such as Calix and ADTRAN pushed intelligence to the network edge and even to users' premises while mighty Microsoft bragged about placing major bets on scraps of leftover TV "white spaces" spectrum to deliver – wait for it – wait longer – wait some more – 3 Mbps (well, maybe 10 Mbps in some places, Microsoft hopes) by 2022?

The contrast between companies such as ADTRAN, Calix, Cisco and Corning, which envision 10 Gbps fiber networks that instantly, and in most cases automatically, adjust to network traffic loads – and Microsoft, which has a goal of helping 2 million rural U.S. customers gain any kind of access through cranky, slow wireless, exposes the contrast between the broadband haves and the have-nots.

FOR THE HAVES

The Open Network Operating System (ONOS, onosproject.org) is an open-source operating system for running software-defined networks. About 50 partners have signed on. Calix offers what is, at least for the moment, a more mature operating system of its own, AXOS, with a particular focus on the network edge. Oversimplifying a bit, vendors and users can build their own modules to snap into ONOS or AXOS (or similar operating systems coming soon) and control a wide

range of emerging generic "white box" network equipment. SDN becomes SDA – software-defined access.

The idea is to run these operating systems mainly on Linux x86 computers (cousins to our laptops) near customers. The approach is scalable – the more customers, the more x86 computers. It's faster and more secure than sending data back deep into the cloud. And it's more reliable because mistakes will affect few customers, if any. Corning and other fiber producers note that it works even better with higher fiber counts – which increases overall deployment cost by just a few percent.

FOR THE HAVE-NOTS

But what about areas with low population density? Fiber is still an option, given the right conditions (lots of poles with cheap access, short drops, not many trees or rocks in the ground), even down to four or five customers per route mile. The fiber can be supplemented with point-to-point wireless, which generally does not require tall towers and offers lots of bandwidth, but can be unreliable in bad weather.

For even lower densities, Microsoft proposes long-distance Wi-Fi using the white space "buffer" spectrum between old UHF TV channels. In the United States, white spaces are scattered around 600 to 700 MHz, varying by region. It really is Wi-Fi – the IEEE standard for this technology is 802.11af. A typical installation would be on a tower that serves customers up to 10 miles away and provides 3 Mbps.

Microsoft and others have been building a database for prospective deployers to find out where the channel scraps are. Its first U.S. deployment was a 2009 test in Claudville, Virginia, where Microsoft partnered with Dell and Spectrum Bridge. Working with existing and potential ISPs such as rural electric co-ops, it has proposed connecting 2 million by 2022 for \$10 billion – \$5,000 a premises for one rural resident out of every 20. How is that competitive, given the low revenue potential?

Has the United States really sunk that low? ❖

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