Making Rural Deployments A Reality

People in rural areas simply can't rely on the same fiber-rich, centralized split model that works in more densely populated areas. Distributed tap architectures may offer a solution.

By Kara Mullaley / *Corning Optical Communications*

If you've been following this series, you've no doubt realized I'm a big proponent of fiber. We've touched on how far society has come with technology and its impact on daily life, how existing operators can reuse assets to their advantage, and how planning for converged networks can shape providers' service offerings. But what about those rural unserved and underserved areas? What options do operators have that make closing the digital divide a reality?

THE PAST

Most deployments in North America have centralized split architectures as the foundation, in which moderately sized cables of 24 to 48 fibers feed splitter cabinets (typically with 1x32 splitters inside) serving hundreds of subscribers each. The distribution cables reaching from the cabinet to homes or businesses are often 72 to 144 fibers. That's a lot of glass! But more important, higher fiber counts anywhere along the network drive increases in splicing costs and larger splice closures, which in turn drive up the size of handholes or pedestals in buried environments.

That's where the business case tends to fall short with rural builds. Rural areas simply can't expect the same fiber-rich, centralized split model to apply where the number of potential subscribers per mile can be counted on fingers and toes. It just isn't economical.

A DIFFERENT WAY

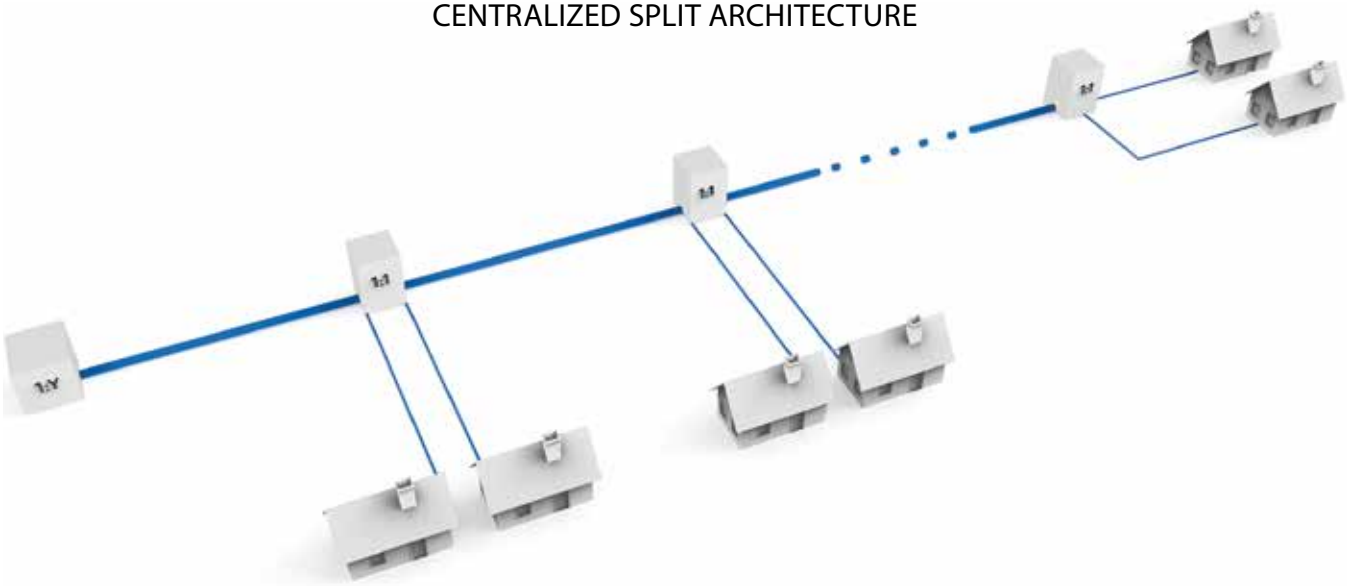
In regions around the world, distributed split architectures are more the norm. For those unfamiliar with distributed split design, it's simply replacing a singular large-capacity cabinet containing 1x32 splitters with two or more concatenated splitter terminals or closures that achieve the same or similar net effect split ratio. Because the splitters are physically separated, the cables that connect the first-layer splitter from subsequent splitters can be that much leaner. This drives down the fiber counts and associated hardware and labor installation costs.

In many cases, a design using even-powered splits in series of 1x4 and 1x8 terminals easily supports basic broadband needs for smaller cities and towns in which subscriber density is moderate. That still doesn't always prove out economically for very rural, long country roads where subscribers are few and far between.

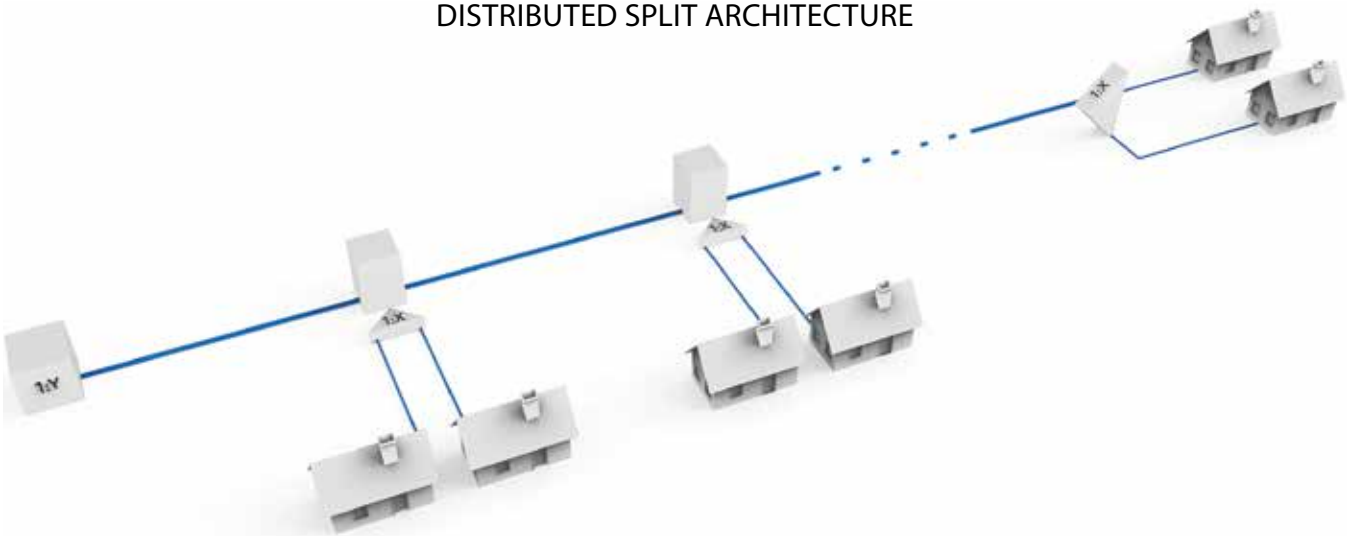
PULL A PAGE FROM THE CATV PLAYBOOK

What is now beginning to emerge as an attractive option for rural deployments is an optical architecture that mimics the HFC network. Known as a distributed tap architecture, this variant of distributed split utilizes uneven or asymmetric splitters to tap a small portion of the optical power from a single optical fiber to service subscribers along sparsely populated routes. Used in conjunction

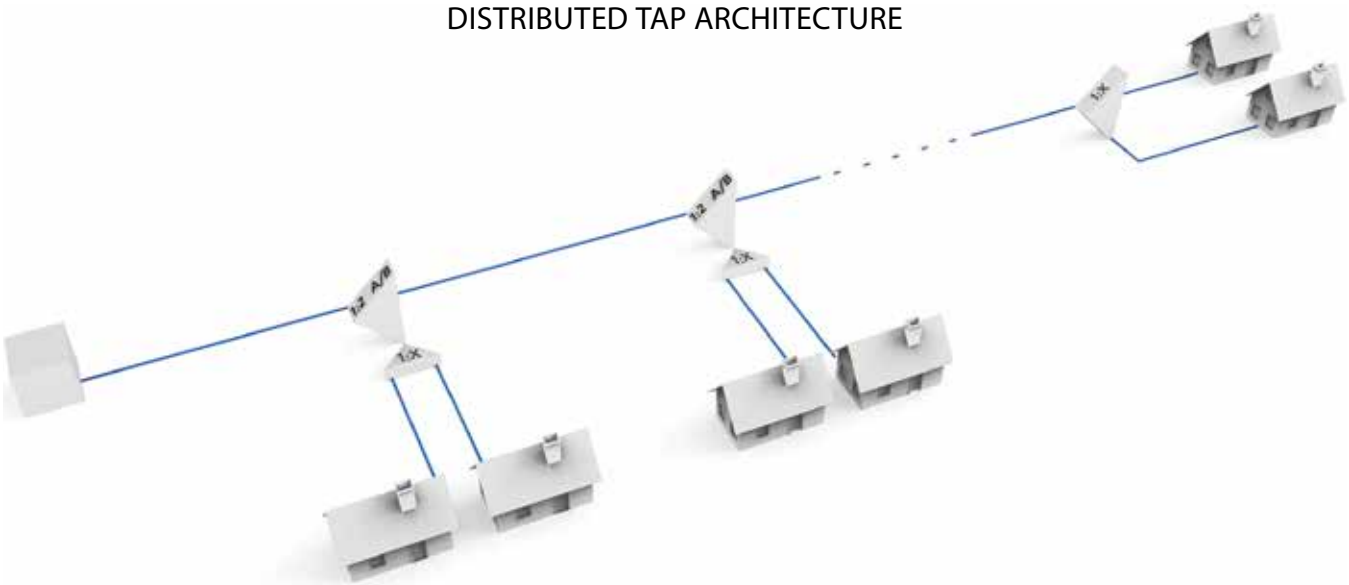
CENTRALIZED SPLIT ARCHITECTURE



DISTRIBUTED SPLIT ARCHITECTURE



DISTRIBUTED TAP ARCHITECTURE



with even-powered splitters, this distributed tap architecture further leans out the distribution of the network to just one fiber, significantly reducing the civils and labor needed to deploy.

Although cost advantages of this leaner approach can be significant, the trade-off is limited flexibility to support future growth and the next generation of bandwidth-intensive applications that are always on the horizon.

BUILDING THE CASE TO BUILD THE NETWORK

There's no one-size-fits-all approach to bringing broadband to the rural United States. No matter what type of architecture is ultimately decided upon, the first order of business is to assess the overall needs of the network and determine how to fund such a build. The goal of a community may vary from basic broadband connections to individuals and businesses to a more futuristic desire for a smart-community platform that enables all manner of connected devices. These needs and wants will shape the build planning and impact the total costs to install and operate.

Funding options are equally as broad. With an array of capital investors willing to support public-private partnership arrangements, municipal bond initiatives, or federal government assistance through programs such as the Rural Utilities Service or the Rural Digital Opportunities Fund, financial support for rural fiber optic infrastructure builds is on the rise.

SOUND ADVICE

Whether you're a municipal leader, an existing communications provider, or a utility provider looking to help deliver a more enriching digital experience to rural communities, the options may seem overwhelming at times. There is truth in the adage "nothing worthwhile is ever easy." But my advice continues to be very simple: Engage with telecom leaders that have your interests in mind and work seamlessly with other players in the ecosystem to ensure a smooth deployment that delivers on your unique needs. ❖

Kara Mullaley is global FTTx marketing manager at Corning Optical Communications. With 20 years of industry experience, she is an expert on best practices for worldwide fiber deployment, network architectures, and solutions to address operators' specific challenges and strategies for staying ahead of demand for high-bandwidth services and applications. Connect with her on Twitter @KaraMullaley or on LinkedIn at www.linkedin.com/in/kara-mullaley.