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Cost Calculations of Fiber and Copper

by Barry Walton

With simultaneous overtop video and multiple devices operating in the home now a part of everyday life, network operators are revisiting their bandwidth and investment calculations.

When much of today's copper network infrastructure was upgraded to broadband, downstream was the only consideration and bandwidth demand at the home was a mere fraction of what it is today. Using the copper plant originally installed to deliver essential voice services was enough to satisfy the initial bandwidth demand – and it made sense financially at the time, especially in areas where there was little competition.

Consumer connectivity expectations are vastly different today than they were during the first upgrades to broadband, with the number of connected devices steadily climbing and applications enabled by the "internet of things" (IoT) increasingly gaining traction. Even from my own perspective as a consumer, 2 megabyte service is not capable of handling both me and my wife working from home at the same time, so several months ago we reconsidered our options in pursuit of faster broadband.

Network operators are following suit, taking a closer look at the capabilities of fiber to reliably deliver the high-speed connected possibilities that are becoming integral to daily work and life. Widely accepted as the clear choice to get ahead of the bandwidth demands of the IoT and 5G trends, an overbuild of optical fiber infrastructure is the answer to aging, copper networks.

Completely overbuilding a network comes with known, straightforward costs summarized through project planning: How many homes is the network operator passing? What are the distances, material costs, and local labor rates? Perhaps not as clear to many network operators are the considerable costs associated with delaying the eventual fiber overbuild and continuing to operate legacy copper networks in the near term – especially in light of investments by their competitors.

Maintaining a copper broadband network comes with operating costs not borne by passive optical networks. They are manifold, from maintaining batteries in the field and dealing with water and salt intrusion, to the service issues that negatively affect the subscriber experience. In my conversations with network operators, a recurring theme I hear is, "when customers are connected with fiber, the service works and delivers consistently." On the other hand, copper-based broadband service can be less reliable and often requires several repeat truck rolls with technicians of various skill sets to carry out the frequent repairs needed to maintain service speeds.

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As consumers become more dependent on their broadband connection to enable their daily lives, reliability of a robust broadband connection is becoming an essential service, as important as land line phone connections where speed-to-repair is all the more crucial in emergency restoration scenarios. Recently, several network operators shared restoration stories during extreme weather events and clearly illustrated the advantages of fiber-based networks.

In the wake of Hurricane Sandy, in 2012, service areas around entire central offices in the Northeast had to be rebuilt. Rather than spend regrettably and brace themselves to repeat the cycle with the next big storm, operators replaced legacy copper with a fully passive, optical plant. The results are compelling: the fiber-based networks are 70 to 90 percent more reliable, consume 40 to 60 percent less energy, and ultimately deliver nearly 60 percent operational savings every year since the transformation.

Even more recently, in 2017, Hurricane Harvey flooded much of the Houston area and revealed that the full optical communications infrastructure was largely unaffected due to the inherent advantages of fiber over copper in wet conditions. Once power was restored to homes and businesses – either over the power grid or through subscriber use of generators – connectivity immediately resumed.

Restoration and reliability are becoming another factor for network operators evaluating their evolution to an all-fiber network. Time is of the essence, as more communities are seizing on the benefits of broadband as a municipal utility, underscoring the need for network operators of all sizes to deliver fiber to the people, businesses, and "things" that demand high-speed capabilities. In Fairlawn, Ohio, for example, the community broadband provider FairlawnGig has achieved an approximately 50 percent take rate despite multiple incumbent offerings. So growing competition is part of the equation as well for operators of legacy networks.

Industry leaders are making plans to stay ahead of the competition through strategic investments in network migration. Deloitte Consulting estimates that the United States requires an investment of 130 to 150 billion dollars in fiber infrastructure over the next five to seven years to adequately support broadband competition, rural coverage, and wireless densification.

The convergence of customer expectations with new application trends and performance standards has rendered what once made financial sense no longer adequate, especially given growing competition and declining costs achieved through fiber optic product and deployment innovations.

Ever-increasing consumer demand for bandwidth does not appear to be a reversible trend. Many network operators find themselves at this crossroads – so they are looking through the lens of their individual business models and weighing the relative costs associated with replacing copper with fiber right now vs. making choices while in maintenance mode to ease the eventual transition to FTTx.

Whether deploying fiber optic infrastructure to prepare for the delivery of next-gen services and applications, to expand into new territory, or to otherwise unlock new revenue streams, operators are making choices today that will affect their business for the next 10, 20, even 50 years. Investments in fiber not only include revenue generation and customer retention, they also deliver operational savings when the copper network is decommissioned.

Let's talk about it.

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