Technology Strategies for Municipal Fiber Broadband

Building next-generation gigabit architecture and outstanding subscriber experience into today's networks is a sound investment.

By Ravi Hichkad / *ADTRAN*

As more municipalities enter the world of broadband service delivery, they face a range of challenges in project planning and decision-making. Some of the most significant deployment considerations involve network technology selection. Deployers must choose what to invest in amid a complex, evolving landscape of broadband technology solutions.

Municipal network planners and operators need to make the right investment decisions from a cost standpoint and identify solutions that can best future-proof their networks to meet the demands of their communities and subscribers for many years to come. Two critical lessons for today's municipal broadband network builders concern the value of investing in next-generation, high-capacity gigabit architecture and providing the best subscriber experience.

CURRENT TRENDS IN BROADBAND NETWORKS

Even though there is no one-size-fits-all approach to broadband deployment, fiber optic solutions are universally viewed as the best path forward for municipal network development, with GPON as the technology of choice for cost-effective, point-to-multipoint access delivery.

Fiber broadband installation has evolved considerably in recent years as new and improved techniques, such as microtrenching, help save on construction costs. In addition, fiber optic technology enhancements and improvements in connection and distribution methods have gone a long way in reducing the expense of connecting subscribers. State regulatory changes and new models for community broadband partnerships also account for the increasing popularity of fiber networks.

The result has been a rise in the ability of operators across the United States to deploy GPON fiber-to-the-premises networks and cost-effectively provide the competitive advantages of gigabit speeds with immense capability. However, most of this advancement in broadband access has occurred based on 1 Gbps PON technology, which worked well until now but doesn't present the best business case for the future.

GPON has been the fiber network standard for a decade, but it doesn't present the best business case for the future.

THE NEED FOR NEXT-GENERATION GIGABIT

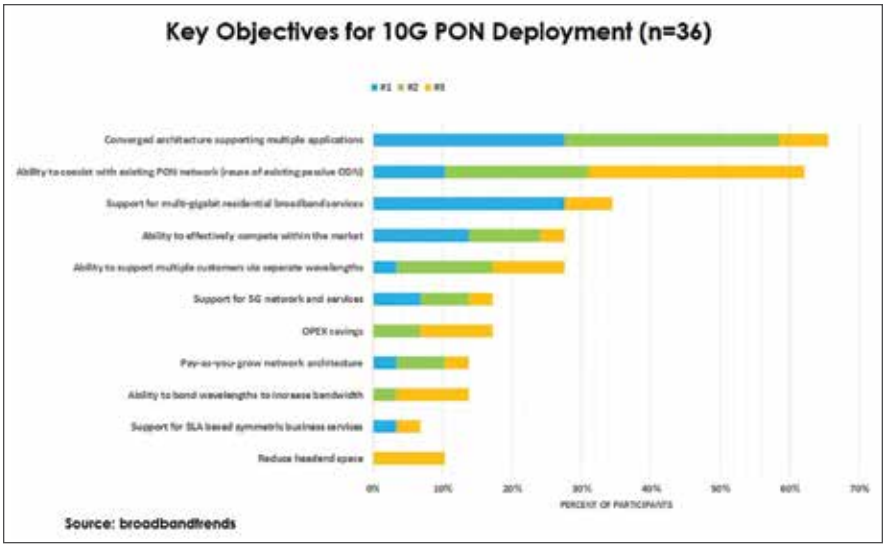
Despite the tremendous innovation in FTTP networks over the last decade, growing

bandwidth demands from households and enterprise business applications are likely to exceed today's GPON network capacity levels in the near future. Network traffic is expected to grow by an order of magnitude over the coming decade, in part because more high-bandwidth applications will become commonplace. These include consumption of 4K and 360-degree video, augmented reality and virtual reality immersive applications, data-heavy cloud services, internet of things traffic and autonomous vehicle usage, to name just a few.

Clearly, municipal network planners can expect to see the demand for broadband continue unabated for the foreseeable future. Operators face the daunting challenge of figuring out how to "feed the beast" and address the requirements of countless emerging technologies and applications without their networks becoming obsolete.

Next-generation 10 Gbps PON network architectures offer the ability to support current service needs and scale economically as needed to address multigigabit bandwidth demands well into the future. The primary value of 10G technologies lies in capacity. For a municipal utility looking to better manage smart-grid applications through communications network advancements, a next-gen 10G network architecture offers an optimal path to servicing public power demands and providing symmetrical 10 Gbps service for residential subscribers, business customers and mobile backhaul services, all over a single, common infrastructure.

Compared with today's requirement of building separate networks for utility, residential, business and cellular customers, converging all services onto a single network delivers greater flexibility and reliability, creates substantial savings in capital expenditure for deploying the network and curtails operating expenses for managing it. Moreover, with costs only marginally greater than today's GPON technologies, an investment in a 10G PON architecture allows municipal network operators to maintain competitive price points on services, enabling greater business and residential adoption throughout the community.



Operators see many advantages of deploying 10G PON technology.

SUBSCRIBER EXPERIENCE DEMANDS 10G PON

Investing in the proper access technology is critical to keeping pace with network bandwidth demands, but providing the best broadband experience for customers is equally – if not more – important. Just as municipal utilities want to be sure their citizens have positive experiences with power services, today's broadband network operators must do the same for their subscribers. Connecting new users ought to be simple and fast, and maintaining insight into subscribers' service experiences allows providers to leverage network analytics to improve customer engagement.

Quality of experience begins with the process of turning up new service for a customer, and municipal network operators keen on making turn-up less complicated and time-consuming need to invest in the right tools. Traditionally, service turn-up has involved a significant amount of preprovisioning done on the back end by multiple people, followed by an install technician's arriving at a customer site to handle on-premises equipment. Often, errors in network provisioning may need correcting. All these factors may create frustrating experiences for customers. Fortunately, operators can utilize new network management tools to automate and orchestrate many operations previously prone to human error, speeding up service delivery and improving overall operational efficiency.

Once a customer's service has been activated, how should an operator get in front of network problems before they become issues? Think about typical residential data use – kids playing Fortnite upstairs, parents streaming Netflix downstairs in Ultra HD, smart appliances humming along – and the potential for multiple devices and network congestion to deteriorate household Wi-Fi experience. To prevent such problems, operators need to keep a proactive eye on subscriber usage. By monitoring and analyzing network data patterns on an ongoing basis, operators will have the insight needed to offer services better tailored to address customer needs.

At ADTRAN, we often hear from municipal customers that the difference between being an electric utility provider and an ISP comes down

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to customer service calls. A customer whose toaster isn't working is probably not going to call the power company. However, if the Wi-Fi isn't working – regardless of the source of the problem – complaints roll in immediately. In this case, an operator's best bet lies in remote troubleshooting and diagnosing Wi-Fi analytics. If the right subscriber device management tools have been put in place, service providers can check user device configurations and make necessary changes without costly truck rolls. Moreover, ongoing device management can perform bulk firmware upgrades and configurations to prevent future issues.

A CLEAR BUSINESS CASE

Today's network planners have concluded that traditional network planning and management options for fiber broadband builds simply won't work for the future. In terms of network architecture, next-gen 10G PON is sure to become the standard in delivering on the capacity and reliability needed to meet bandwidth demands today and in the years ahead. Likewise, proactive management of customer experience by leveraging today's best subscriber solutions will be key to the overall quality and success of the network. Municipalities looking to invest in fiber projects for their communities will do well to keep these important network recommendations in mind. ❖

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