Will 5G Make or Break Fiber's Future?

A GUIDE FOR RURAL BROADBAND PROVIDERS

provided by **MAPCOM** SYSTEMS

INTRODUCTION

About the Author

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In May 2019, Verizon proclaimed that they ushered in the era of 5G with a broad rollout in Minneapolis and Chicago. Alongside this proclamation, a few vocal industry pundits speculated that next gen passive optical networks and sub-6HZ spectrum and millimeter wave technology used in 5G enablement in rural areas will effectively "kill fiber."

While a few voices are making this audacious claim, most industry experts, industry analysts, and technology leaders are forecasting just the opposite: **5G will create a new fiber boom into the mid 2020's.**

In fact, an RCR Wireless News industry report - corroborated by Forrester - suggests that demand for fiber will grow at a 19% compound annual growth rate (CAGR) through 2025, fueled by 5G, which is forecast to be a $123.2 billion market growing at 18% annually between 2020 and 2025!

Like Verizon, most Tier 1 providers are already in the midst of their 5G preparations. By the beginning of July commercial 5G services were being offered by Verizon, AT&T, T-Mobile and Spring in metro areas of the US. But with all this opportunity up for grabs, how can smaller providers be poised to benefit from the advancing market?

First let's look at the factors driving the need for 5G and fiber, then examine the implications for rural and regional network operators.

WHAT'S DRIVING THE DEMAND FOR FIBER?

Several economic trends are converging to create this massive boom. Growing consumer video and data usage, mobile device proliferation, the Internet of Things and connected devices, telemedicine, competition between telecom service providers, government incentives, wireless connectivity, and municipally-developed fiber networks are all significant drivers of demand for bandwidth.

This multifaceted increase for demand falls against a backdrop in which 69% of US residential homes do not have adequate fiber connectivity (according to FCC data from 2017), and 64% of US businesses indicate demand for more fiber. So while demand for more bandwidth rapidly increases within the four walls of US homes and businesses, the ability to meet that demand is currently limited.

This climate sets the stage for innovation, and one of the most widely anticipated innovations in telecom is the advent of 5G. Three concepts are fundamental to 5G enablement: an increase in endpoint density, interconnectivity between endpoints, and network synchronization. Fiber is foundational to each of these concepts because of its price, security, and scalability.

CONCEPTS FOR FIBER ENABLEMENT

1. Endpoint Density

Modern data consumption from video streaming, virtual reality, online gaming, teleworking and an ever-growing number of connected mobile and smart home devices is outpacing the capabilities of most networks. Consumers and businesses alike have a growing need for high-performing, high volume, ultra-low-latency, and redundant connectivity. Delivering this level of service requires more network endpoints that are situated nearer to the end user to supply macro, mid-band, and short-band access.

As the number of transmitting towers in that geographic area increase, so do the "processing plants" of network traffic: datacenters. This network densification results in smaller datacenters, often referred to as microsites, instead of the larger centralized hubs common today. Microsites serve end users in closer, smaller areas by processing and routing network traffic in a model commonly referred to as edge computing. The result to users is a faster, more reliable network connection.

2. Interconnectivity Between Endpoints

As the number of transmitting towers and microsites increase, so does the need to connect these endpoints. In the US, there are six primary modes of endpoint interconnectivity, free space optical (FSO), microwave relay, microwave access, next generation passive optical networks (NG-PON2), carrier ethernet, and optical transport networks (OTN). Essentially, these modes break into two categories, wireless and wired.

Wireless endpoint connectivity comprises an estimated 26% of backhaul endpoints in the US, and is likely to play a growing role in point-to-point connectivity. Advances in optical relay technology like NG-PON2, overcome some of the historical issues with wireless reliability and environmental sensitivity.

However, major industry leaders like Verizon and Sprint have clearly stated that wired, fiber-based point-to-point connectivity will be their preferred mechanism and have partnered with several industry leading vendors to build and deploy the first next generation fiber networks in 2019-2020.
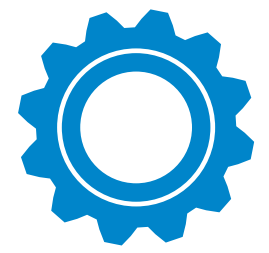
3. Network Synchronization

Network synchronization involves handling the exchange of data and signals as data flows through a network or passes between networks or network nodes. Increasingly, hardware circuits and switches are being replaced by software, in a phenomenon known as software-defined-networking (SDN) and the accompanying network-function-virtualization (NFV). As the number of endpoints grows, and as end users become increasingly mobile, the need to coordinate and orchestrate traffic rapidly increases.

While SDN architecture can effectively orchestrate optical and wireless signals, it has been most closely associated with wired networks. Global Ethernet standards have virtually displaced all legacy transport technologies,8 and are applied to all wired connections, from copper, to coaxial cable, to fiber.

In the ideal future state, wireless and fiber networks converge, and network synchronization will be performed via the combination of software computing, standards-based network sensing, and rules-based routing.

An example of a standard that is influencing network synchronization is the OpenFlow standard, which is based on the Metro Ethernet Forum (MEF) 3.0 specifications. A combination of software control layer software like OpenDaylight and the OpenFlow standard, which enables software access to physical devices, will enable monitoring, routing, and performance normalization of wired and wireless based network traffic.

Dark fiber-based networks and small cell backhaul and fronthaul will likely become a default standard for network construction. Wireless millimeter wave, and free space optical will serve as augmenting or special case technologies and will be used to round out a densified wide areanetwork. Carrier ethernet, which enables synchronization of non-fiber-based optical, wired, and legacy technologies, will likely become the transmission standard.

ARE YOU PREPARED FOR A 5G FUTURE?

Like any major industry-changing event, the onset of 5G and the fiber demands surrounding it will create winners and losers. For those providers who are prepared to take advantage, the next 5-6 years is expected to offer a significant opportunity for growth in fiber-related services.

As the demand for bandwidth leads networks to become denser, less centralized, and increasingly complex, rural and regional providers will need management tools that are powerful enough to harness the influx of network data, yet flexible enough to scale and evolve with the changing times.

Marketing, sales and business development teams need tools that allow them to intelligently prospect, promote and sell services in collaboration with engineering's efforts to build fiber routes. The forecasted 19% annual growth in fiber demand has increased competition from familiar and new players alike. That means it's more important than ever for organizations to quickly assess the potential of different build-out scenarios, accurately estimate and quote opportunities, and maximize ROI by having turn ups scheduled for the first day of available service on a new network.

OSP and ISP staff should take steps to prepare for managing rapidly growing and more intricate networks. Mapping and management tools for outside and inside plant should tie the physical asset map and SDN visualization together to provide a complete understanding of network operations. Monitoring and tracking functionality will be vital to ensuring service delivery and minimizing audit risk. Providers should also look for solutions with automation capabilities, like network discovery tools, that help keep plant records current with the constantly changing network hardware inventory.

CSRs and field techs need real-time visibility into network information – from any device, at any location – to provide excellent customer service. They should have reliable access to operations and customer data in the same system to streamline daily tasks and eliminate unnecessary inter-departmental touch points.

Business leaders need an up-to-date, integrated interface to contextualize and consume all the data pouring in from the network, customers, and staff. With that kind of information at their fingertips, the C-suite can quickly identify trends, discover insights, and feel confident in making decisions that will lead to profitable growth for the business.

CONCLUSION

Whether or not 5G truly lives up to its early hype for consumers and businesses remains to be seen. But it's safe to say that our data consumption habits and collections of connected devices isn't going to slow down anytime soon. The concepts central to addressing the demand for bandwidth with 5G networks – endpoint density, endpoint interconnectivity, and network synchronization – will create a shift in the way networks are built and operated.

Service providers who want to capitalize on the projected fiber boom in the 2020s need to arm themselves with systems that will enable them to keep pace with market, manage networks growing in both size and complexity, and present data from multiple sources in a single, end-to-end platform. It's critical to have these systems in place ahead of the flurry of network construction to avoid unnecessary delays and duplicated efforts.

In a market that is rapidly changing and becoming increasingly competitive, Mapcom Systems is staying ahead. The M4 Solutions suite is a powerful and versatile platform that combines best-of-breed fiber management tools, data integrations and automation to create a complete view of the network so business can make informed decisions, save time, and grow revenue.

For more information about M4 RevGen (marketing & sales), M4 Fiber (fiber planning and management), M4 Network Equipment Manager (inside plant) or other solutions that can help set your company up for success in the 5G era, please visit www.mapcom.com.

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ABOUT MAPCOM

Mapcom Systems is the developer of the M4 Solutions Suite, which allows communication service providers to combine data, fiber management tools and automation to create a complete view of the network that fosters efficiency and growth. Mapcom Systems partners with providers around the world, but primarily those in rural America.

To learn more about Mapcom Systems or M4 Solutions, visit www.mapcom.com.