

JAN/FEB 2024 VOL. 42 | NO. 1

ISE

**ICT SOLUTIONS
& EDUCATION**

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EXECUTIVE INSIGHTS WITH **Michael Wynschen**

CEO, HUNTER COMMUNICATIONS



FLAT OUT FAST

Flat Drop Fiber Installation

- Save time & money
- Reduce labor & minimize damage
- Eliminate manual hand over hand fiber installations

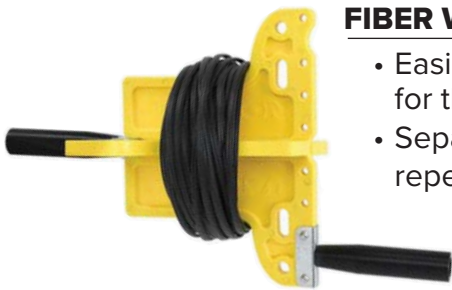
FLAT DROP FIBER DRIVER (18-FFP1)

- Safely feed FTTH flat-drop fiber
- Utilizes a standard power drill
- Fits in a standard size tool box



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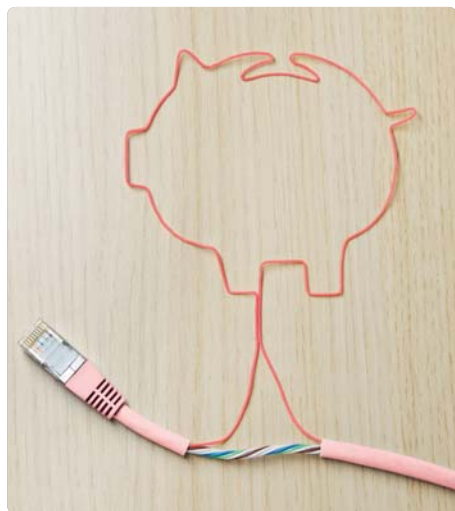
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ICT Visionary Q&A

Brian Schrand

VP, Applications Engineering, Clearfield



“The solution is our Home Deployment Kit which comes packaged with everything they need to do a self-install from the demarcation on the house to their network gateway.”



For more information, visit www.SeeClearfield.com.

ISE: New technology being introduced allows customers to do the final step of the fiber installs using plug-and-play technologies. Is Clearfield going to be a player in that space?

Schrand: The most time-consuming and expensive operation in installing a FTTx network is hooking up the customer. A technician can spend a significant amount of time inside a customer's premises. Clearfield has responded to service provider requests to offer a solution that allows their subscribers to perform a self-installation. The solution is our Home Deployment Kit (HDK) which comes packaged with everything they need to do a self-install from the demarcation on the house to their network gateway.

ISE: Selecting the right network architecture for your fiber deployment is a major key to your company's success. Each type has benefits and drawbacks. What's the best option for your build and business model?

Schrand: Speed of deployment, ROI, cost per home passed, capital and operating expenditures are all factors that broadband service providers (BSPs) take into consideration when choosing their network model. However, network capability is often overlooked. A network's capability or performance is dependent upon its link loss budget. Keeping loss to a minimum will provide a robust network and extend its longevity. Splitters are the largest contributor to network loss—therefore, it's important to design a network where you can control the amount of splitter integration.

Home run architecture is the most fiber rich, having a one-to-one fiber ratio from the electronics to the subscriber. It offers the most flexibility but also costs the most to build.

Centralized split is currently the predominant leading PON architecture. The fiber ratio is one fiber from the electronics to a splitter, typically 1x32, in a cabinet with a one-to-one fiber

ratio to the subscriber. Centralized flexibility lies in the ability to change the split ratio at the cabinet. Centralized is less costly than home run, but still takes a significant amount of time and capital to construct.

Distributed split is second behind centralized. The fiber ratio is one fiber from the electronics to a multi-layer split, usually 1x8 to 1x4, then to a one-to-one to each subscriber. There is little flexibility for upgrades due to splitters being distributed throughout the network, but in contrast to the previous two, it's less expensive to build because it eliminates the need for cabinets and requires less splicing labor.

Distributed tap is an optical version of a coax network. The fiber ratio is one fiber from the electronics to optical couplers to splitters. Signal is bled off at each coupler to feed a splitter which then feeds subscribers. It's a limited, asymmetrical network with no flexibility for upgrades. The benefits are speed to deployment and low capital cost.

ISE: What is Clearfield doing to help push active equipment to the edge of the network to cut down latency and optimize routing capabilities?

Schrand: The exponential growth in bandwidth demands is causing BSPs to evolve their edge and access networks to accommodate 10 Gbps in anticipation of 100 Gbps. This evolution requires actives be pushed out closer to subscribers. In edge networking, regional and demographic considerations create a need for multiple cabinet sizes that are environmentally controlled and accommodate a variety of equipment configurations and fiber terminations. Clearfield recognized BSPs challenges for pushing equipment to the edge and developed the fiber optimized FiberFlex cabinet line. The flexibility of the FiberFlex line addresses all the associated issues BSPs face, for easements, power and environmental. It can be intimidating when choosing cabinet options. Clearfield offers both pre- and post-sales support to assist customers during the entire process. ■

Moving in the Right Direction

I'M EXCITED FOR THE NEW YEAR. I mean, we have to be, right? We can't walk into 2024 still dragging the problems of 2023 behind us—we must face it with gusto.

A new year doesn't have to signal a monumental shift in the world or your own life. Sometimes it can just be a very small change to your mindset. Or adding or subtracting one small thing. And maybe that small change will ripple across your entire life, or the world, setting straight, amplifying, or coloring in the existing structure, and breathing life and progress into it.

This year I'm very excited about ISE EXPO. It's a symposium of intelligent people sharing an interest, all gathered in one place to discuss the future of a connected society. We're not reinventing ISE EXPO this year, but we're continuing to make it better and have added an advisory board of telecom gurus to guide the show into its future. And I'm very excited to bring back our ISE Network Innovators' Awards Program for its second year.

Last year, I was at the Innovators' Awards ceremony and got to meet each one of the Honorees. The immediate impression I got while talking to them is passion and an optimism about the future. It's contagious, and you easily get swept up in it. So, I'm calling on you all to submit your nominations for the 2024 ISE Network Innovators' Awards (see page 25 for details). Don't be shy! We want to know what you've been up to, and I'd really like to meet you.

Now as for this first issue of the year, we're covering a lot of trends. It's great to start the year with firm grounding and context about what last year was and what this year is likely to bring (aside from surprises). The consulting firm Kearney has written a telecom trends article for us this issue that dives deep into the nitty gritty. And you'll also find enterprise telecom trends and industry predictions.



Joe Gillard

EXECUTIVE EDITOR

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Follow Joe on LinkedIn for further conversation and insights.

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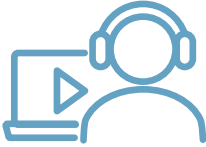
Visit www.isemag.com/contribute for more information on submitting an article to ISE Magazine in print, digital, and online.

In addition, you'll learn about TAP networks, the Golden Resignation, and so much more.

We're also very proud to introduce our new network and security expert, Mark Fishburn, who will have a recurring column about cybersecurity and telecom that comes from a deep well of insider knowledge, as well as intuition and wisdom. You'll definitely want to check it out.

It's a new year, so let ISE Magazine be your companion as the industry moves forward. Make sure to check us out online as we'll be publishing more great content there at isemag.com and on social media.

Here we go!

66% 

Stream On

Video makes up nearly 66% of total internet traffic volume.

SOURCE: Sandvine

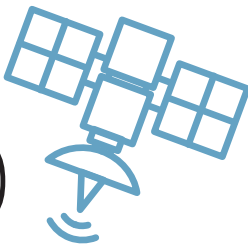


36%

BUNDLE OF FUN

In 2023, 36% of households said they would pay more for a broadband bundle in exchange for good customer service, up from 32% in 2022.

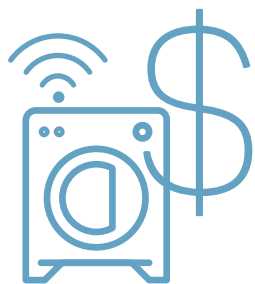
SOURCE: Ernst and Young

5,000 

THOSE AREN'T UFOS

SpaceX has launched over 5,000 Starlink satellites into space.


SOURCE: The New York Times

50% 

Smart Money

Half of households said that smart home devices aren't convenient enough for the cost.

SOURCE: Ernst and Young

 43%

Behaviorism

43% of consumers are less interested in new connectivity and content experiences than before. However, only 17% are reducing spend on streaming and 16% reducing spend on broadband.

SOURCE: Ernst and Young



30%

DOIN' THE TWO-STEP

30% of people have never heard of Multi-Factor Authentication (or Two-Factor/Two-Step Verification).

SOURCE: National Cybersecurity Alliance



Fast, Cheap and... Unlimited

Unlimited mobile wireless plans cost 43% less and are 117 times faster than in 2010.

SOURCE: CTIA



Is it Time to Update Your Gear for the New Year?

IT'S THE NEW year, time to reflect on the past and think about the future. Make some resolutions that are well meaning but often hard to keep—you know the ones! But let's focus instead on fiber optics. We should review some recent changes in technology and think about what the fiber optic contractor or installer needs to know to keep up with our fast-moving technology and marketplace.

What's changing? Cables are changing. They are getting much denser—both smaller for the usual number of fibers as well as larger for higher fiber counts. Service providers want more fibers, especially for crowded urban ducts and data center interconnects where cables are now available with 1728, 3456 and 6912 fibers. OSP cables are more likely to be smaller than the ones for data centers because of the difficulty of installation of the very large cables in ducts, but a few metro areas are using 864 and 1728 fiber cables.

These high-density cable designs began with microcables, especially in the 144 or 288 fiber versions, which can be blown into microducts only about 0.5 inch in diameter (See Figure 1). Microcables and microducts are gaining popularity in urban areas because the installation is cheaper and much less disruptive than with traditional underground cables.

All these high-density cables share some design features. Most are flexible ribbon designs based on bend-insensitive fibers which can be rolled up tightly in buffer tubes. In fact, my "insider information" is that the hard ribbon designs of the past are soon to be extinct. The other design "features" that make cables smaller

are thinner jackets and smaller strength members or none at all.

Even the fibers are being downsized to pack more fibers into a cable. The glass fiber is still 125 microns outside diameter but the primary buffer coating, which has been 250 microns OD for forever, is being downsized to 200, or even 160 microns. There is also talk of reducing the glass fiber size too, but that does not seem imminent.



FIGURE 1. Microcables of 288 fibers (L) and 144 fibers (C) are barely larger than a pencil.

All these new designs are great for installing more fibers, something everybody wants now, but they do have some negative issues too. In the past, cables were often over-designed; able to withstand higher pulling tension, more crushing loads and were less sensitive to bending beyond the specified minimum bending diameter (See Figure 2).

Some of these new high-density cables are not as forgiving of mishandling during installation, according to what I hear from some of the field application support people I know. We've heard reports of fibers being broken during



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installation because of violations of pulling tension and/or bend diameter.

With the big cables, the minimum bend diameter can be larger than current tools being used to pull cables. An 864-fiber cable may have a 30-to-40-inch minimum bend diameter. How many contractors have pulling capstans, sheaves or quadrant blocks large enough for that cable? Larger installation equipment is now becoming available and will be needed if the contractor is going to be handling these larger cables.

Many of these cables, especially microcables, are designed for installation by blowing not pulling. While blowing cables has been used worldwide for years, it's still new to most contractors and installers in the U.S. While there are only a few suppliers of blowing equipment, they do seem to offer training and it's something everyone should be learning.

The next issue with these cables is splicing (See Figure 3). Since all are ribbon cable designs with flexible ribbons and most have very high fiber count, ribbon splicing is the splicing method of choice. Trying to splice a high fiber count cable with a single fiber splicer would take too much time; ribbon splicing is about six times faster.

When it comes to choosing a fusion splicer for these fibers, you also have to consider that you will have cables with fibers that have coating diameters of 250,

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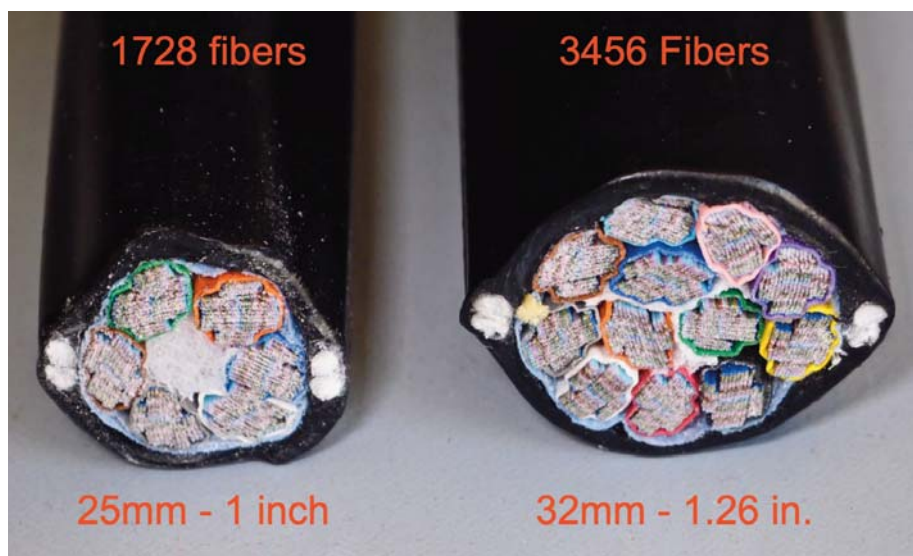


FIGURE 2. High fiber count cables are densely packed with fibers.



FIGURE 3. FOA instructor, Ian Gordon Fudge, shows a class at a data center what a 1728 fiber cable looks like before beginning his splicing lab. Photo courtesy of Ian Gordon Fudge

200, 180, and (maybe soon) 160-micron coating diameters. When splicing cables, you may have to mix fiber coating sizes. The ribbon fusion splicer you choose should be able to handle the different coating diameters, different types of flexible ribbons and even hard ribbons, all of which you may encounter in the field.

You probably also need to look at your tools. My fiber toolbox I used for training is big. I had a half dozen different cable jacket strippers and at least as many fiber strippers—Millers, NO-NIKs, and Micro-Strips. Specialized tools for jobs like midspan access. Crimpers, scribes, knives, pliers, the list of tools goes on and on. I also often have components, tools and equipment loaned from manufacturers for evaluation. As the FOA's person coordinating the development of training curriculum for our worldwide network of hundreds of schools, I try to personally test anything new.

"In the past, cables were often over-designed..."

I recently discovered my trusty old cable jacket stripper was not large enough to strip an 864-fiber cable—its diameter was too large. I had to resort to a lineman's knife to remove the jacket.

All fiber optic contractors and installers are faced with the same situation. Keeping up with all the changes occurring in fiber optics is necessary to remain competitive in today's marketplace. Magazines like ISE and websites like theirs are important sources of information that can help you keep up to date on fiber optic technology.

It's not just knowing what's new that's important. It's important to know when it's time to retire old tools and equipment and replace it with the new generation of gear. And as you replace the gear, it's also important to learn how to properly use this new gear, which means taking advantage of the training manufacturers provide. ■

Jim Hayes is a VDV writer and educator and President of The Fiber Optic Association.

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THE HIDDEN POWER OF Zero Trust Thinking

Daytime Stress and Sleepless Nights

Managing cybersecurity, networks, workloads, and websites can be stressful especially when many things go bump simultaneously in the middle of the night. During calmer daytime moments, we rationalize decisions, selecting the right defensive or application architecture, analyzing problems, balancing business and technical requirements, based on logical thinking.

Reality Check

However, when we think we are making logical choices based on facts, brain science tells us that we are actually making emotional decisions. These are based on what will cause us less stress or risk to our reputation or company. Receiving praise for meeting personal performance indicators is important—or maybe we just like the person selling us something.

After that, we look for reasons to justify such decisions based on logic, showing off our smart thinking to look good and be admired. So, what has this got to do with Zero Trust?

Zero Trust: Principles, Methodology, and Implementation

For those not fluent in the term coined by John Kindervag, creator of Zero Trust methodology, here's my quick overview of the principles and methodologies:

- **Two Principles.** The first: **Assume a Breach** has already happened. It's the second: **"Never Trust, Always Verify"** that really shifts your thinking and empowers you—and it's what this article is all about.
- **Methodology.** Define your security policy of what to protect, curating and testing the resilience of your assets.

Then, know the flow of data and what to monitor. Repeat to keep strengthening potential vulnerabilities in the many physical, organizational, and technical processes.

- **Implementation.** The "how" and "where" is pretty straightforward, consisting of Identity Management, Authentication, Access Control, Least Privilege, Policy Enforcement in many locations and processes, Automated Monitoring and Micro-segmentation. It's a big topic and you should be skeptical of "Complete Zero Trust Solutions."



Why Does Zero Trust Empower Your Thinking?

So, why does "Never Trust, Always Verify" and the technical aspects of cybersecurity empower your decision-making? It's only when you look at the impact and value of verification on your decision-making that you see how it influences clear, stress-free decision-making.

1. COMMITMENT

"Always Verify" Implies	"Trust" Implies
A Commitment to Being Secure	An Expectation That It's Secure

When you trust somebody or something you do so with an expectation it's all going



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to work out just fine. However, expectation is dangerous. When things don't work out, you either blame yourself or somebody else for the result not being what you wanted or expected. When you verify, you are implementing your commitment that the processes, the software, the devices, and the people you train will be secure. Clearly there are no guarantees with security, but if things don't work perfectly, instead of being upset, you are left with your commitment to keep verifying. It's all part of the journey.

2. DELEGATION

"Always Verify" Implies	"Trust" Implies
Managed Delegation of Responsibility	Abdication of Responsibility

Only when your HR department, your service provider, software supplier, CPA firm, your physical security company, etc., verify in writing that what they have delivered is secure, are you truly delegating not abdicating your responsibility. This makes a huge difference to how you operate your security. I have further developed this since my ISE article last August (at cybyr.com/delegation) to show all the steps for providers and software companies to self-verify their products and services.

3. INTEGRITY AND CONTROL

"Always Verify" Implies	"Trust" Implies
Integrity	Sense of Incompleteness
Empowering and Proactive	Disempowered, Passive

If you just trust your own internal departments or a third party, then you are left with a sense of being incomplete. This is why verification gives you a sense of integrity or, expressed another way, you are whole and complete—and not stressed.

Deploying unverified software can be very passive and is the source of many catastrophic attacks. You are just not in control yet still liable for any consequences. Properly delegating and verifying supply chains' internal processes is both empowering and proactive. This is why Zero Trust aligns closely with how you can take an executive responsibility in your organization, helping you contribute and add value to your organization in a new way.

4. PROTECTION, CONFORMANCE, AND COMPETITIVE POSITIONING

"Always Verify" Implies	"Trust" Implies
Measurable Written Protection	Uncertain Liability, Accountability
Competitive Positioning	Cost Center

Verification also provides written, measurable protection that is an essential element of the SEC's requirements to show that you have proper processes in place. It works to the benefit of your organization and your suppliers, effectively creating a paper trail that can be included in your website's terms and policy statements.

All of this is not just to ward off stress and uncertainty. This whole ethos can not only be used to enhance your competitive position to those who do not adopt it, but also to create your organization as a leader in protection of your business clients and end-user customers. This transforms adoption of Zero Trust from pure defense into a difference-making competitive advantage.

5. CONTINUOUS MONITORING

"Always Verify" Implies	"Trust" Implies
Continuous Monitoring and Auditing	One-Time Monitoring

Verification is not a one off—which is why I prefer my version of the mantra "Never Trust, Continually Verify" to the original.

What or who was authenticated five minutes ago may now be out of policy. This is why continuous monitoring and notification is another important strengthening of defensive links. This is, after all, why it's never over.

Final Word

Hopefully as you've read this, you can see why Zero Trust creates clear thinking to reduce the stress and acknowledges the

emotional aspects of your technical and business decisions. If you do get it, then I advise taking a deep breath, putting a smile on your face, and getting back to enjoying your job!

Find out how to put all of this into action and more at cybyr.com. ■

Mark Fishburn is a provider of strategic network, cybersecurity, and marketing services.

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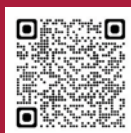
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EXECUTIVE INSIGHTS WITH

Michael Wy

The 30-Year Overnight Success of Construction Firm to Broadband Provider

BY SHARON VOLLMAN

TOPIC: What is your “Why?”

Michael Wynschenk: Our mission is to help our customers create lasting and meaningful connections with each other, their communities, their customers, and the world.

This is not an easy industry. What we do is hard. We are building networks in extreme weather conditions. We enter homes as strangers and leave as friends. Because what our industry does matters. What Hunter does matters.

TOPIC: Community Connections

ISE: To celebrate your May 2023 expansion into Chiloquin, Oregon, you hosted a Community Pizza Party at the Chiloquin Community Center. You also run campaigns to reduce cyberbullying and offer scholarships to students across your service area. Share two other ways you strengthen community connections in telehealth, developing a homegrown workforce and digital inclusion.

Wynschenk: The pandemic saw a boom in the use of telemedicine like nothing we’ve ever seen before. According to the *Journal of American Medical Association*, there were less than 1 million telemedicine visits nationwide in 2019. That number skyrocketed to over 50 million during the pandemic. The Pacific Northwest utilizes telemedicine almost twice as much as other regions in the country.

At Hunter, we provide symmetrical fiber internet service to our residential customers, vital for a strong

video connection during a telemedicine appointment. We also provide fiber optic service to most of the region’s larger hospitals and medical facilities, including Asante and Three Rivers Medical Center. Upload speeds at the home and the medical facility are imperative for doctors to communicate clearly and accurately diagnose medical conditions.

While Hunter participates in ACP, we have also created special pricing programs for Veterans and active military personnel, teachers, and parents. In December, we launched the Hunter Family Safety Bundle, which includes our symmetrical fiber optic internet and our Hunter Shield Suite of Internet security products, enabling parents to monitor cyberbullying while building trust and helping their children maintain privacy. This aligns with our values of providing fast, reliable, affordable, and safe internet.

TOPIC: Community Employment

ISE: Given labor challenges, how does Hunter attract, train, and retain workers from the areas it serves?

Wynschenk: Customers and employees are attracted to our company because of our service reputation. On a scale of 1-5, our Google rating is 4.8—the highest of any internet service provider in the Pacific Northwest. Our reputation provides a distinct advantage in employee recruitment. People want to work for a company they can be proud of and where they can make a difference.



Wynschenk

CEO, Hunter Communications



Wynschenk (left) and Greg Higdon (right), Hunter's Director of Installation and Maintenance, walk the yard at Hunter's Central Point, OR, location.

“

Our industry and society goals should be ubiquitous access, not a ubiquitous delivery system. Fiber is not necessarily always the answer; however, when it is the answer, communities should support and endorse micro-trenching.”

TOPIC: Muni Partnerships

ISE: Why should municipalities work with a network provider instead of building their fiber networks?

Wynschenk: A municipality's core competency is not owning or operating a fiber network in a competitive environment where cable and telecom companies already provide service. Having a five-to-10-year plan to upgrade and reinvest in technology is a requirement to remain relevant in our industry; this is a foreign concept to most municipalities.

The general nature of municipalities could be more conducive to change. Turnover of elected officials and management employees in the public sector can lead to shifts in focus and priorities based on what is important to each official at that moment. This can hinder a municipality's ability to overcome the inevitable collective challenges.

TOPIC: Crystal Ball for the ICT/ Telecom Landscape

ISE: What's next for our industry?

Wynschenk: The future is faster, more reliable internet with continued progress on digital equity, and that is focused on internet safety.

Companies like Hunter will work with partners and in-house developers to introduce new applications to leverage the millions of miles of fiber that have yet to be placed. This includes making the internet safer, improving business productivity, and enhancing in-home entertainment experiences.

TOPIC: Workforce Retention

ISE: What is the telecom industry missing in recruiting/retaining younger professionals? What is the company doing in this area?

Wynschenk: Young professionals want to be engaged, they want to be developed, and they want to have exposure to leaders in the business. They want to be mentored.

Members of our leadership team host immersion meetings to address business challenges. This is where management and employees work together to create better results for the business and our customers. Employees are at the decision-making table and find the experience and exposure invaluable.

In 2022, we launched our “Get Ready” Program, which helps facilitate career progression through employee training and mentorship. This program has matured from where department

heads nominated employees to where employees participate in an application process. Our inaugural class saw seven out of 10 participants “graduate” and promoted to next-level roles. We are currently preparing to complete the training for the second graduating class.

Our Construction department utilizes a formal apprenticeship program, where individuals with little experience can grow from a ground hand into an aerial lineman. There are eight different tiers that a construction employee needs to complete, with the possibility of program completion in as little as two years. Since its inception, we have promoted 17 employees through this program.

TOPIC: The Future

ISE: What emerging or disruptive broadband technology excites you the most? Why?

Wynschenk: To say the pandemic was disruptive is an understatement. But it affected our industry differently than



Wynschenk (left) and Samantha Hess (right), Hunter's Director of Finance, review plans for 2024.

others. It opened society's eyes to internet capabilities that were always underutilized. Telehealth, working-from-home, online classes, and streaming were all there before the pandemic.

As we look to the future, it will get even more disruptive. The fiber speeds available by 2034 will be virtually unlimited compared to how we think today. In 2018, the industry identified the "Super Power User" as a subscriber using 2TB of monthly data. In 2023, a new category was established—the "Extreme Power User." Extreme Power Users make up more than half of all internet subscribers today and use 5TB or more of data each month.

In 10 years, TV sets may be obsolete, and the in-home entertainment experience will be radically different, supported by many of the technology builders in our country. Companies like Cisco, Meta, and Microsoft are building technology and entertainment solutions to blow consumers' minds.

Approximately 170 million people worldwide use virtual reality, and its future is increasingly leaning toward multisensory experiences. It's not just about what users can see but what they can touch, smell, and even taste. The more realistic the virtual world, the more immersive and captivating the experience will be for the user.

From gaming and social media to medical treatment and education, virtual reality will transform and enhance our most significant and even the littlest experiences. This technology will rely heavily on the internet service companies like Hunter Communications provide.

TOPIC: The Elephant in the Room

ISE: What is our industry NOT addressing that it should in terms of network evolution and broadband for all?

Wynschenk: As an industry, we need to better educate consumers about the risks associated with the internet and help them make informed decisions about what personal information they share. We provide access to technology that can harm people. These solutions need to cover everyone in the family, including senior citizens.

At Hunter, we have recently launched Hunter Shield—our suite of internet security products to protect residential consumers and small businesses from viruses, spyware and malware, cyberattacks, and cyberbullying. These products are a start, but there is still much to be done at an industry level.



In December 2023, Wynschenk and members of his team signed 300 holiday cards for Operation Holiday Joy. Cards were sent to residents in senior living facilities in Josephine County, OR.

TOPIC: Fiber Field Realities

ISE: Time, talent, and cost are the enemies in deploying fiber deeper in the last mile. What are the best ways to help defeat those enemies?

Wynschenk: Our industry and society goals should be ubiquitous access, not a ubiquitous delivery system. Fiber is not necessarily always the answer; however, when it is the answer, communities should support and endorse micro-trenching. As BEAD dollars flow into the industry, states must move quickly to improve the permitting process, including funding positions to accommodate timely execution.

All parties must also be open to other solutions, including fixed wireless. As the FCC deploys additional spectrum, we must consider last-mile fixed wireless technology to ensure our most rural customers have access to high-speed service.

To overcome these enemies, firms need a strategy incorporating people, processes, and technology, which leads to overall financial health. Continually leveraging technologies in all departments will lead to improved processes and efficiencies.

ISE: Telecom providers still have trouble converting "homes passed" to "homes connected." Only 20 countries across the globe currently have more than a 50% fiber penetration rate. What's a feasible solution?

Wynschenk: In 2020, we were able to pivot following the pandemic and started to expand our fiber network to residential neighborhoods near our commercial customers. We removed all barriers to success with our offer strategy. We gave consumers

fast and reliable service at an affordable price with lifetime pricing, no contracts, no router fees, and no data caps.

Once we started to generate brand awareness around our residential service, customers began coming to us. We focus on the importance of social media to tell our success stories while ensuring the in-home experience is easy for customers, resulting in a positive experience.

Many providers employ a “If you build it, they will come” mentality. At Hunter, we do the opposite and bring our fiber network where consumers have expressed interest. This way, we decrease our CPGA and increase our penetration rates quickly.

TOPIC: Hunter Communications 3,000-plus Fiber Network

ISE: How does Hunter Communications build its fiber networks? What portion of your deployment is handled in-house versus by contractors? Share two best field deployment practices your team can teach other network providers that improve time-to-market and reduce cost-per-mile and unit passed.

Wynschenk: Hunter Communications is a 30-year-old company that started as a construction firm specializing in fiber networks. In the early 2000s, we began building our network, focusing exclusively on commercial accounts, including schools, hospitals, and state agencies. This created significant expertise in engineering, permitting, and all phases of the construction process.

We then pivoted in the early stages of the pandemic to expand this capability to include residential neighborhoods.

Our best practices utilize lean processes to document and detail our project plans, leveraging highly collaborative interdepartmental engagement. This begins with pre-build customer registration via our website and concludes with our sales and marketing plan, which leads to a high penetration level within the first six months of service availability.

We have recently started supplementing our activity with subcontractors to keep up with the significant demand for our services. Eighty-five percent (85%) of our engineering is completed in-house, along with 70% of our construction and splicing.

TOPIC: Change Management and Culture

ISE: What have you learned about culture and change management that help your teams succeed?

Wynschenk: To influence company culture, businesses must clearly define and communicate their mission and brand values. At Hunter, we developed both with our employees’ feedback through surveys and in-person sessions to ensure our process was inclusive. Our values include fighting for our customers, doing the right thing, and putting all people first. They give us a barometer to measure against. We don’t do it if it doesn’t align with our mission and brand values.

We have also created a culture that involves employees in decision-making processes to help them understand our why and to help us succeed. Too often, leaders focus on setbacks instead of

celebrating achievements. Our employees have firsthand experience in what is and what isn’t successful. It is essential to involve them in identifying challenges and implementing solutions.

TOPIC: Leadership Style

ISE: Please share ONE word that encapsulates your leadership style. And ONE word that describes you as a person.

Wynschenk: I want to think the one word that describes my leadership style is “inspiring.” I selected that word because I am passionate about this industry, which I’ve been in for over 35 years. I have learned that people want to be a part of something bigger than themselves, and when given an opportunity, they will work together to accomplish great things.



Wynschenk (right) and Jim Lamp (left), Vice President of Construction, discuss Hunter’s ongoing network expansion.



"I have learned that people want to be a part of something bigger than themselves, and when given an opportunity, they will work together to accomplish great things."

TOPIC: Out-of-the-Box Thinking

ISE: How has the Hunter Communications Network team colored outside the lines to do business differently and better for its employees?

Wynschenk: We are disruptors in our industry. Nothing we do is cookie-cutter, from our offers and approach to the market to our recruitment and retention strategies.

We encourage and act upon employee feedback through quarterly surveys (which have an 85% response rate), live and in-person town hall meetings, and skip-level management sessions. We act quickly to address and solve employee concerns. Our underlying methodology is training and development, from our Senior Leadership Team to all employees.

We can also pivot to address products and services when we experience sales challenges. If a particular geographical area isn't responding well to an offer we have released, we modify it as quickly as two weeks.

TOPIC: Inspiration

ISE: In growing organizations, there can be a tendency for the "institution" to dampen the "inspiration." How do you keep this from happening on your team as you grow?

Wynschenk: Our inspiration built our institution. Employees know and understand our why. We reference it frequently in how we make decisions. Our strategic pillars—people, process, technology, and financial health—also keep us focused on doing what is right.

Several leadership team members from larger companies came to Hunter because they could affect real change and make an impact here. Our environment supports being disruptive and gives our employees the autonomy to make a difference.

TOPIC: Personality Trait

ISE: What's an essential personality trait someone needs to succeed in a company like Hunter Communications?

Wynschenk: Leadership is a trait we look for all employees to have. We seek those who are confident in their decision-making capabilities yet nimble enough to learn from mistakes, resulting in the ability to change direction when needed.

Collaboration is essential here as we have grown fast, move fast, and compete hard as a team. To succeed at Hunter Communications, working cross-functionally with a strong sense of urgency is critical to creating success for our customers and investors. ■

Michael Wynschenk joined Hunter Communications in April 2020 as Chief Executive Officer. Wynschenk is a seasoned executive with senior leadership experience with wireline and wireless carriers. With more than 30 years of experience in the telecommunications and cable industry, he has a strong track record of growth acceleration and value creation. Wynschenk has held leadership roles at a variety of regional and national firms including AT&T, Verizon, Altice, Alaska Communications, and BendBroadband.

Hunter Communications is the fastest growing telecommunication provider in the northwest. Known for its outstanding customer service, highly engaged employees, and disruptive approaches in the market. Hunter began as a construction company 30 years ago. The firm pivoted to provide fiber services to businesses in the early 2000s, and entered the residential market during the pandemic, offering FTTH throughout the state of Oregon. In 2021, Hunter acquired McMinnville Access Company and in 2023, Hunter acquired Origin Networks, LLC, both under Wynschenk's leadership, thus expanding the company's serviceable footprint.

For more information, visit hunterfiber.com. Follow Michael on LinkedIn: www.linkedin.com/in/michael-wynschenk-7b15584/. Follow Hunter Communications on LinkedIn: www.linkedin.com/company/hunter-communications/, Facebook: www.facebook.com/HunterFiber and Twitter @hunterfiber.

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2023 Telecom Year in Review and 2024 Predictions

A deep dive into the telecommunications industry for 2023 and 2024 from global management consulting and strategy firm, Kearney.

BY KEN QUAGLIO, CHRIS CORTELLINI, AARON RUCINSKI, AND DAVID SIEGEL

In 2023, the U.S. telecommunications industry was confronted with serious macro-economic and industry-specific obstacles—interest rates continued to increase, environmental concerns were raised, and competition accelerated. Even so, the industry remained resilient. This year's trials have prompted organizations to develop innovative solutions—such as securitizing assets, rolling out improved fiber tech, developing 5G revenue streams, and investing in artificial intelligence. We'll kick off this year-in-review by exploring all these themes and more before looking ahead to 2024—detailing how we expect the industry to adapt to tomorrow's challenges.

2023 Trends

In 2023, several noteworthy trends emerged across the industry in general:

Interest Rates. The high interest rate environment continues to impact the telco landscape. In 2023, as of November, the Federal Reserve has raised federal funds rates four times to 5.25-5.50%, sharply increasing the cost of

capital for all communications players regardless of size. Rate increases are adding cost pressure which is weighing on the speed of telco organizations' builds.

Operators continue to focus on cost cutting by utilizing a variety of tactics. The high interest rate environment has also impacted M&A deal flow—total CMT M&A deal value was down over 60% in the 12 months up to May 2023, while deal volume was down 20% over the same period.

BEAD Program. Broadband Equity, Access, and Deployment (BEAD) continues to roll out, providing \$42.45 billion in funding for planning, infrastructure deployment and adoption programs



for high-speed internet access in all U.S. states and territories. BEAD calls for awardees to deploy fiber broadband in all but extremely high-cost areas—where awardees will be able to use Fixed Wireless Access (FWA) and certain other technologies, but not satellite broadband. In June 2023, the federal government announced the allocations of funding to each U.S. state and territory.

Potential Broadband Reclassification.

In September, the FCC announced plans to open a Notice of Proposed Rulemaking to reclassify broadband from Title I to Title II. This reclassification would subject

broadband to regulation under the 1934 Communications Act, which could open broadband to price regulation. In the past, worries over price regulation have led to sell-offs of cable stocks. The FCC's announcement led to minimal market movement—a result of the scope of the “Chevron Deference” being narrowed during *Sackett v. EPA* in May 2023.

Artificial Intelligence. Interest in artificial intelligence (AI) has surged and telco companies are responding accordingly. AI has the potential to relieve cost pressure and enhance the customer experience—providing personalization to drive sales

claiming lead-sheathed cables comprised a negligible fraction of their copper network footprint.

When compared to other sectors that are treading water or regressing, the fixed wireline sector has been a bright spot, experiencing modest success:

Fiber Buildouts. Builders continue to roll out fiber-to-the-home (FTTH) in the U.S. at a relatively aggressive clip. In 2023, at least 7 million passings were planned. While some builds have been scaled back, most fiber builders are actively pursuing both FTTH builds and deepening fiber in their networks for hybrid fiber-coaxial (HFC) players.

Supply Chain. Despite the extreme lack of availability across the market seen in 2020 through 2022, inventory availability for electronic components and equipment started to grow in 2023 as supply chains recovered. This new capacity is aligning to support the wireline buildouts across the U.S. and are indicative of a broader recovery into the future. The same was true for construction services.

DOCSIS 4.0. Beyond traditional fiber, DOCSIS 4.0 technology is enabling faster speed on HFC. This technology will improve capacities downstream and upstream to 10 Gbps and 6 Gbps respectively. Comcast had the first commercial launch of DOCSIS 4.0 (branded “X-Class Internet”) in October 2023 in Colorado Springs, with plans to launch in parts of Philadelphia and Atlanta by end of year.

Private Equity Financing. Mounting debt poses a challenge for companies aiming to raise capital to support growth. In efforts to reduce costs and attract additional financing, wireline telcos are turning to private equity firms that are investing heavily in American digital infrastructure. Gigapower, a Blackstone and AT&T joint venture that closed in May, is a prime example.

Fiber Securitization. In this regard, several fiber players securitized their assets

“

“AI has the potential to relieve cost pressure and enhance the customer experience—providing personalization to drive sales and reduce churn. This technology is currently being deployed in network planning, customer engagement support, and personalized marketing.”

and reduce churn. This technology is currently being deployed in network planning, customer engagement support, and personalized marketing. The emergence of AI will place a greater emphasis on digital infrastructure and on fast, low latency connections.

Lead Cables. While ESG still remains a priority for telco operators, this focus has lessened recently due to rising interest rates and competing priorities. One ESG concern that became top of mind is the lead content of aging cable networks. In July, *The Wall Street Journal* published an article highlighting the presence of lead-sheathed cables in carrier networks. In the week that followed, AT&T, Verizon, Lumen, and Frontier shed a combined \$18 billion in market cap. However, Wall Street's anxiety was short-lived, as stocks quickly rebounded from the news-incited dip—a result of reassuring statements by both the EPA saying that the amount of lead found did not constitute immediate health threats and companies



All photos courtesy of Kearney

in order to gain access to lower cost funds. Because the market continues to place a premium on fiber—due to low obsolescence risks and cheap operation costs relative to cable/HFC—securitization of fiber assets has become more popular than securitization of other fixed wireline assets. The most notable example has been Frontier closing \$2.1 billion worth of fiber securitization notes in 2023.

ARPU. From a topline perspective, the average revenue per user (ARPU) is gradually rising. Cable Broadband ARPU growth is positive for the four leading players year-over-year as of Q3 2023—Altice USA (0.3%), Charter (2.6%), Comcast (3.9%), and Cable One (6.5%).

The video sector continues to slump, yet consolidations offer a path forward:

Cable Programming. As content owners raise programming costs, operators are finding it harder to justify these expenses, especially considering their already narrow margins from their linear video businesses. The recent agreement between Charter and Disney illustrates how cable and content provider negotiations are changing. At the forefront of the deal was the inclusion of Disney+ and ESPN+ streaming in select Spectrum TV video packages. Disney's negotiation will set the stage for future network operators with streaming (e.g., Paramount with Paramount+ & Showtime, Warner Bros. Discovery with Max), and further hurt leverage among other cable networks that keep only their linear offerings.

Satellite TV. At the same time, satellite TV providers such as Dish and DirecTV continue to see mounting subscriber losses—each losing ~300K to 400K in Q2—as consumers turn to wireline, FWA, and OTT packages.

Despite innovation in the 5G space, the wireless sector remains at a crossroads:

Capacity Demand. As the world becomes increasingly digital and as FWA rollout gets wider, operators must build enough infrastructure to avoid data demand straining

capacity. Data demand is at all-time highs and will continue to grow as adoption of technologies such as Augmented Reality/Virtual Reality (AR/VR), higher quality (4K/8K) streaming, AI, and cloud gaming intensifies. AT&T has already seen network traffic grow 30% year-over-year for the past three years.

Wireless Spectrum. Telcos are seeking to expand their capacity through purchases of additional spectrum licenses. Comcast announced plans to lease and eventually sell some or all of their spectrum licenses in the 600 MHz band to T-Mobile. New



“In September 2023, AST SpaceMobile used a Galaxy S22 to make the ‘first ever’ 5G connection between an unmodified smartphone and a satellite in space, from a wireless dead zone in Maui, HI.”

spectrum issuances hit a road bump, however, when the FCC's authority to auction parts of the broadband spectrum expired in March 2023. Reinstating these rights is currently being held up in part due to decisions over the future of the 3.1GHz-3.45GHz spectrum band—wireless companies want access, but it's currently used by the U.S. military.

Low Consumer Subscription Growth.

Wireless operators are scrambling for new strategies to combat stagnating consumer growth—Q2 2022 to Q2 2023 saw a disappointing 2% increase in total wireless subscriptions. Operators are facing heightened competition from cable companies who are making big gains with a 76% share of net additions in Q2.

Fixed Wireless Access. Wireless telcos are exploring additional ways to monetize their 5G networks. The most successful method thus far has been FWA, which continues to expand. Fixed Wireless/5G home internet services from T-Mobile and Verizon added around 890K subscribers in Q2 2023, compared to 815K net adds in Q2 2022. Despite the growth, rates of FWA subscriber additions should slow as the initial opportunity has been captured. AT&T has launched their new FWA offering (branded “Internet Air”) in response to T-Mobile and Verizon. Operators are scaling these programs by focusing on select markets with enough wireless coverage and capacity to serve both the home internet and wireless markets without having to build additional infrastructure. The question for all wireless operators is how much FWA can they sell in each market before it starts to impinge on capacity.

Private 5G. Private 5G networks offer another monetization angle for 5G. To enable activities such as Industry 4.0,

private 5G offers a way for companies to deploy networks that support IoT and other applications. These networks are also being deployed in schools, hospitals (Cleveland Clinic), sporting events (F1 Grand Prix in Miami), festivals (Lightning in a Bottle Music Festival), construction sites, and mines—anywhere businesses are trying to wow their customers or speed up operations. While operators are excited about the opportunity, growth in the market has been slower than the industry would have hoped—telcos face competition from hyperscalers such as AWS, Google Cloud and Microsoft Azure, which are leveraging their extensive cloud and edge platforms as a consolidated offering with network connectivity. In February 2023, Hewlett Packard Enterprises acquired Athonet to bolster their ability to deploy private 5G networks as part of their broader Aruba networking portfolio—a further sign of non-telcos looking to break into the market.

Satellite offers the promise of connectivity to those in remote and uncovered areas:

Low Earth Orbit. Satellite communications are an emerging way to provide broadband connectivity, particularly in rural or hard to reach areas where traditional infrastructure buildouts would not be economical. Low Earth Orbit (LEO) Satellite operators such as Starlink (SpaceX) and Kuiper (Amazon) continue to promise access to millions of unserved and underserved users in the U.S., and millions more around the globe in places where traditional infrastructure builds are not physically or economically feasible. Whether LEO reaches the full market hype that many expect remains to be seen. Satellite is unlikely to replace wireless/wireline offerings where it is already established, and growing wireless internet and wireline expansion will reach more and more rural markets, which may limit the addressable market for LEO operators.

Telco-Satellite Cooperation. In May 2023, AT&T announced it would lease spectrum to AST SpaceMobile. In the



agreement, AST will not transmit in areas covered by AT&T's terrestrial cellular network but can train their spot beams on uncovered areas. The arrangement also includes providing temporary coverage after natural disasters. Meanwhile, in February 2023, Globalstar announced that Apple would lend it \$252M to help pay for new satellites, ensuring that Globalstar would continue to support Apple's iPhone emergency service.

Improving Technology. In September 2023, AST SpaceMobile used a Galaxy S22 to make the "first ever" 5G connection between an unmodified smartphone and a satellite in space, from a wireless dead zone in Maui, HI.

2024 Predictions for the Telecom Industry

We see these trends extending into 2024, as technology and component availability continues to improve while the new

consumer base shrinks. Telcos will continue to see growth in some areas even as others gradually phase out:

Increased Broadband Focus on SMB.

With the saturation of the consumer market across the telecommunications industry along with sustained high interest rates and low rates of household formation, net additions growth in broadband is likely to remain anemic. Net additions growth will be increasingly difficult in the larger markets, with most of the opportunity centered in less urban markets. As a result of operators experiencing heightened competition, there will be an increased focus on the small and midsize business (SMB) market for growth. Telcos will re-evaluate how they serve this market and further bundle products accordingly.

Focus on Margin Growth. We anticipate management will increasingly focus on improving EBITDA margins to

maintain cash flow in the wake of rising long-term debt costs.

AI Takes the Spotlight. AI-driven connected planning will optimize the return on capital for network builds. AI experimentation in telco Sales and Network will continue, as tangible use cases for network planning, customer success/service, and marketing personalization are developed. Meanwhile, AI will begin to drive an increase in network consumption as the data required to feed models continues to grow.

Creative Wireline Expansion.

Consolidation and scale will remain a focus for wireline operators. Interest in M&A among fiber players will remain high, particularly as operators seek to attain a competitive footprint within their target geographies. High interest rates will



“In efforts to reduce costs and attract additional financing, wireline telcos are turning to private equity firms that are investing heavily in American digital infrastructure.”

be a headwind to traditional debt-centric acquisitions, so we expect more creative deal structures to emerge, including wholesale models. The move to open access fiber networks is just beginning in the U.S. and will present a capital-efficient way for operators to expand their reach.

Cable Bundles Continue to Win. Fiber remains the gold standard, but large cable companies are working to negate the speed delta with the rollout of DOCSIS 4.0. While cable operators struggle with the perception of legacy technology, the move to a converged wireless/wireline bundle will continue to pay off. Given the bundling value proposition, customer adoption will remain high with a substantial payoff for the cable companies if they can improve customer experiences to retain their base. Cable companies are also looking to continue their fiber edge-outs to gain new subscribers and counter fiber overbuilders.

Cable Operators Expand Small Cell Deployment.

Watch out for cable companies continuing to deploy strand-mounted small cells. While this will help with EBITDA margins, as they are able to offload demand from the variable cost agreements with mobile network operators, they will have to develop new operational capabilities and deploy different equipment. This will require more fixed costs and a transition from operating expenses (OpEx) to capital expenditures (CapEx) to increase the amount of wireless consumption on their own networks.

Move Over, Copper. Incumbent local exchange carriers that still have copper customers are seeing churn rates higher than expected. This trend will continue to accelerate as FWA expands and ultimately fiber is available due to BEAD.

Business 5G Comes of Age. 5G B2B use cases will continue to emerge. 5G technology is finally reaching the point where “true 5G” is becoming market ready. For example, T-Mobile recently announced a network slicing beta for developers based on application type.

Growth in Private 5G. Additionally, we expect to see an increased uptake of hybrid and private 5G. While some major telcos have backed off on their ambitions for the market, hyperscalers such as Amazon Web Services and Microsoft Azure are partnering with telcos such as Federated Wireless to offer private 5G networks to enterprises on the CBRS spectrum.

The full picture of the telco industry in 2023-24 shows an increasingly complex and layered environment dependent on acquisitions, partnerships, new technologies and innovations, and of course the consumer and industry bandwidth to adopt and promulgate them. From 5G to fiber optics to satellites in space, we see an industry poised for further growth and expansion. ■

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IQGeo

Jameson Tools

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Core/Legacy

Budco, Inc.
Channell Commercial Corporation
Comtest Networks
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FS3, Inc.
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Jonard Tools
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VeEX, Inc.
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BICSI
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FTTX

3-GIS
A-Aerial, a division of Altec
ADB
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Atkore
BHC
Blue Diamond Industries, LLC
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CCI Systems

CHR Solutions
 Camozzi
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 Charles Industries LLC, an Amphenol Co

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CommScope
 Comtest Networks
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ESPi

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 MOUNTAIN, Ltd
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VeEX, Inc.
 WL Plastics
 Western Pacific Telecommunications
Zyxel
 ■ SEE AD ON PAGE 9

I&M/Network Reliability/ Cybersecurity

Budco, Inc.
 Channell Commercial Corporation
 Dycom Industries, Inc.
 FS3, Inc.
 LEOCH Battery Corp.
 Petroflex NA
 Quest Controls

Mapping/GIS

3-GIS
 BHC
 CCI Systems
 Esri
 Finley Engineering Company, Inc.
 IQGeo
 MOUNTAIN, Ltd
 Millennium
 Netcon Americas
 ONUG Communications
 VETRO, Inc.
 Vivax-Metrotech Corp.

Miscellaneous

American Products

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Craftmark Cable Markers
 FS3, Inc.
 MaxCell
 Oldcastle Infrastructure
 Positron Access Solutions Corp.

Network Transformation/ Simplification

3-GIS
 Border States
 CommScope
 Dura-Line
 Esri
 Go!Foton Corp.
 IQGeo
 MP Nexlevel
 MaxCell

Safeguard Equipment
 Western Pacific Telecommunications
Zyxel
 ■ SEE AD ON PAGE 9

Power/Sustainability

Atkore
 C&D Technologies
 CyberPower
ESPi
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 East Penn Manufacturing Co, Inc.
 GS Yuasa Energy Solutions, Inc.
 LEOCH Battery Corp.
 MPINarada
 Michels Corporation
 Multilink, Inc.
 Petroflex NA
 Power & Tel
 Quest Controls
 Rainbow Technology
 Safeguard Equipment
 Superior Essex Communications
 Technetix
 WL Plastics

Public/Private Partnerships (P3)

Budco, Inc.
 Graybar
 Oldcastle Infrastructure
 Tii Technologies, Inc.
 VETRO, Inc.

Rural BEAD/Digital Divide Solutions

3-GIS
 A-Aerial, a division of Altec
 ADB
 Atkore
 CCI Systems
 CHR Solutions
Clearfield, Inc.
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 CommScope
 Esri
 Finley Engineering Company, Inc.
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MP Nexlevel
Millennium
NDS
Power & Tel
Superior Essex Communications
Tech Products, Inc.

Safety

A-Aerial, a division of Altec
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Craftmark Cable Markers
FS3, Inc.
Graybar
MPINarada
Power & Tel
Pro-Mark Utility Supply, Inc.
Rainbow Technology
Reef Industries
Safeguard Equipment
Tech Products, Inc.

Testing

Border States
Celerity Integrated Services, Inc.
Fiber Plus International
Graybar
Power & Tel
Ross FiberOptic, LLC
■ SEE AD ON PAGE 19
VIAVI Solutions
VeEX, Inc.
Vivax-Metrotech Corp.

Trends/Research

FIBERONE

Wireless

ADB
American Products
■ SEE AD ON PAGE 13
Border States
C&D Technologies

Charles Industries LLC, an Amphenol Co
Clearfield, Inc.

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East Penn Manufacturing Co, Inc.
Esri
Go!Foton Corp.
Graybar
Jonard Tools
MacLean Network Solutions
MaxCell
Michels Corporation
Oldcastle Infrastructure
Pearce Services
Positron Access Solutions Corp.
Rainbow Technology
Superior Essex Communications
Tii Technologies, Inc.
VIAVI Solutions

Zyxel

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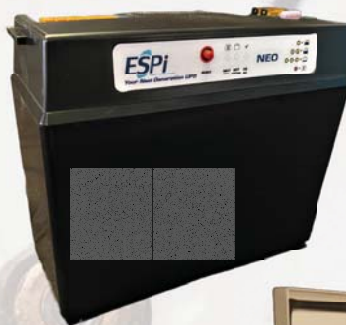
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CATEGORIES: C&E/Planning | Cloud/IoT/M2M | FTTX | Mapping/GIS | Network Transformation/Simplification | Rural BEAD/Digital Divide Solutions



A-Aerial, a division of Altec

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CATEGORIES: C&E/Planning | FTTX | Rural BEAD/Digital Divide Solutions | Safety



ADB

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info@adb-us.com
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American Products is a Strafford, MO, based manufacturer that specializes in producing turnkey telecommunications enclosures. We partner directly with service providers to design, create and deliver integrated enclosure solutions they can count on to protect their valuable networks for years to come.

CATEGORIES: FTTX | Miscellaneous | Wireless



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CATEGORIES: Education



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CATEGORIES: C&E/Planning | FTTX



Border States

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CATEGORIES: Network Transformation/Simplification | Testing | Wireless



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CATEGORIES: Power/Sustainability | Wireless



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CATEGORIES: FTTX



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Channell Commercial Corporation

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CATEGORIES: FTTX | Wireless



CHR Solutions

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CATEGORIES: C&E/Planning | Core/Legacy | FTTX



Craftmark Cable Markers

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CATEGORIES: Miscellaneous | Safety



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CATEGORIES: Education | FTTX | Power/Sustainability



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CATEGORIES: C&E/Planning | FTTX | Network Transformation/Simplification



Dycom Industries, Inc.

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CATEGORIES: C&E/Planning | FTTX | I&M/Network Reliability/Cybersecurity | Wireless



East Penn Manufacturing Co, Inc.

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CATEGORIES: Power/Sustainability | Wireless



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CATEGORIES: Core/Legacy | FTTX



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CATEGORIES: C&E/Planning | FTTX | Mapping/GIS | Network Transformation/Simplification | Rural BEAD/Digital Divide Solutions | Wireless



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Fiber Plus International

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CATEGORIES: FTTX | Testing

FIBERDYNE LABS, INC.

Fiberdyne Labs, Inc.

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CATEGORIES: FTTX | Trends/Research

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FS3, Inc.



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CATEGORIES: C&E/Planning | Core/Legacy | FTTX | I&M/Network Reliability/Cybersecurity | Miscellaneous | Safety



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GS Yuasa Energy Solutions, Inc.

1150 Northmeadow Pkwy, Suite 110
Roswell, GA, 30076, United States
800-472-2879
sales@gsyuasa-es.com
<https://www.gsyuasa-es.com>

GS Yuasa Energy Solutions, Inc. is a subsidiary of GS Yuasa Group, the world's second largest battery manufacturer which specializes in lead acid, lithium, and other battery chemistries. In the US, GS Yuasa's focus is on VRLA products for telecommunication, FTTX, UPS, electrical utility, security, renewable energy, and related markets.

CATEGORIES: Power/Sustainability



HellermannTyton Connectivity

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CATEGORIES: FTTX



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CATEGORIES: Core/Legacy | FTTX | Wireless



LEOCH Battery Corp.

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949-588-5853
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CATEGORIES: FTTX | I&M/Network Reliability/Cybersecurity | Power/Sustainability



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<http://www.macleannetworksolutions.com>

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CATEGORIES: C&E/Planning | FTTX | Wireless



MaxCell



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CATEGORIES: C&E/Planning | FTTX | Miscellaneous | Network Transformation/Simplification | Wireless



Michels Corporation

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CATEGORIES: FTTX | Power/Sustainability | Wireless



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TAPPING INTO Communities

TAP networks can be a higher-value FTTH architecture that makes rural deployments more feasible.

BY PAUL HUBBARD

Fiber-to-the-home (FTTH) architectures are bringing new levels of connectivity to eager subscribers all over the world, and the uptake has been breathtakingly robust. In 2022 alone, 20 million new fixed broadband connections were deployed worldwide, the majority of which were made via FTTH. In fact, of the 1.38 billion fixed broadband connections in operation globally by

March of 2023, fully two-thirds of them were FTTH connections.¹

Going forward, the new fiber frontier is the rural market, and with this sharpened focus come new challenges that didn't exist in urban and suburban deployments of the past. For the providers who are racing to spread fiber to the furthest reaches of their service areas, it all really boils down to a single metric: feasibility—which includes

a number of technological and economical components, such as ROI, total deployment costs, and average revenue per user (ARPU), among others. Optical terminal access point (TAP) architectures can make rural markets more feasible to serve.

The Challenges—and an Architectural Solution

The lower population densities of rural communities, the large variations in distance between premises, and their distance from central offices and other distribution infrastructure, have combined to keep these communities among the most frequently underserved in the nation. Simply put, the miles of required fiber and handful of customers simply do not add up into a feasible business case. At least, not until recently.

Over the last few years, the U.S. Federal Government has recognized the need to ensure all citizens are able to participate in our increasingly connected digital society, and to this end



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has allocated significant funding to support the deployment of broadband networks to those communities who lack reliable, high-performance connectivity. Right now, the largest component, by far, is rural connectivity. The road to closing the “digital divide” runs through these long-overlooked communities.

With more than \$100 billion committed to expanding the reach of communications networks from coast to coast, service providers are getting some much-needed help in bringing the feasibility equation back

into balance. Ongoing fund releases are earmarked to support rural fiber deployments, including the recent \$42.45 billion allocation for the Broadband Equity, Access, and Deployment (BEAD) program under the Infrastructure Investments and Jobs Act (IIJA).

However, as large as this investment is, the task ahead is much, much larger. With millions of rural households to connect—and FTTH connection costs often ranging from \$6,000 to \$10,000 (or more) per house passed—it’s clear that, even with unprecedented funding levels, cost gaps exist, and service providers are expected to step up and make investments of their own. Yet, the average revenue per user in such deployments has very little wiggle room to improve, so providers must reduce upfront costs as much as possible to fulfill the federal mandate and still pursue a feasible business case.

It’s in this part of the equation that TAP architecture can help expand and accelerate FTTH network deployments, by reducing the time, cost, and labor required to connect individual residences and increase the number of homes passed.

The Business Case for Optical TAP

Unlike more traditional split architectures such as centralized split, which employs one or two stages of splitters (one out of the central office or headend and the other closer to the subscriber), optical TAPs draw against the fiber cable’s optical link budget via a physical TAP splitter (See Figure 1).

The effect is that the new TAP connection siphons a portion of the signal to the connected customer yet allows the rest of

“

“...providers must reduce upfront costs as much as possible to fulfill the federal mandate and still pursue a feasible business case.”

the signal to continue to its next TAP connection. Indeed, this approach somewhat mimics how a coaxial part of a Hybrid Fiber Coax deployment is built.

Each TAP can serve one or more residences, extending as far out as needed until the optical link budget is exhausted or the maximum number of subscribers per optical line terminal (OLT) is reached—usually up to 32 connections, or even up to 64 where XGSPON is employed. For rural communities where passed home density can be as low as 10 homes per mile (or even less), optical TAPs can help a single fiber run to cover a vast linear distance in a remarkably economical way.

The advantages of the TAP architecture are many and significant, and all improve rural FTTH feasibility for providers:

- **Less fiber cable is required.** Fiber TAPs enable service providers to run low-fiber count cable throughout the rural deployment, reducing inventory complexity and simplifying network design. While a more traditional fiber architecture would require 256 individual fibers to connect 256 subscribers, TAP architecture can connect the same number of subscribers with four fibers

FIGURE 1

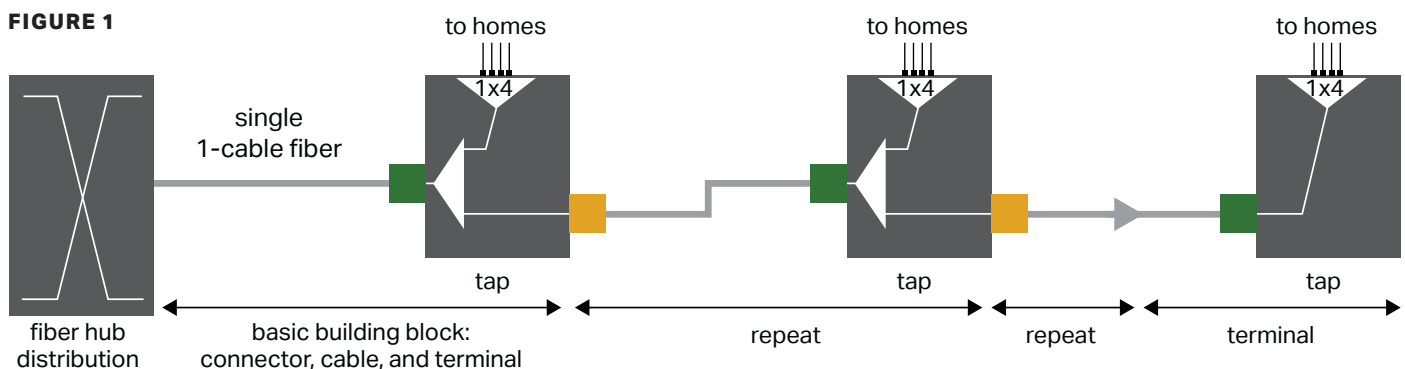


FIGURE 2



(using 16 TAP terminals per fiber, each TAP serving four customers)—and with substantially less overall cable length.

- **Less supporting infrastructure is required.** Traditional centralized FTTH networks also require a great deal of distribution infrastructure in the form of outdoor fiber cabinets. This extra infrastructure can involve securing clearances or right of way (ROW), extensive permitting and dealing with zoning issues, as well as the added cost of installing and maintaining the optical splitters. Optical TAP architecture does not require cabinets or splitters in typical deployments, reducing both the upfront and ongoing network costs.
- **Lighter cable is easier to handle and install.** Lower-count fiber used in TAP architectures provides more linear feet per spool, so providers can cover rural communities' longer-distance cable runs more efficiently. This also means less transportation cost and less waste. Also, because lower-count fiber is slender and lightweight, it's a strong candidate for quick and economical aerial deployments and can be installed in narrower conduits for buried deployments.
- **Labor costs are reduced across the deployment.** Compared to centralized split architecture, optical TAPs and their lower-count fiber infrastructure reduce costs throughout the process by reducing the amount of labor required to design, deploy, and activate FTTH networks.

- **Planning for future expansion is economical.** While TAP architectures are more difficult to expand after deployment as compared to splitter-based architectures, service providers have the option of using TAPs with extra ports as an economical hedge against future subscriber growth. The future availability of these unused ports simplifies the addition of new connections. Likewise, should a cable's link budget tighten too much, these multiport TAPs with spare ports can likewise be replaced with TAPs featuring fewer ports.

Modeling the TAP Advantage

As a provider of FTTH network infrastructure solutions, CommScope modeled the real-world impact of TAP architecture deployments against a traditional centralized architecture within a typical rural deployment environment (See Figure 2).

In the modeled scenario, the average per-home connection cost (including materials and labor) favored the TAP architecture, which delivered a 21% cost savings when compared to traditional centralized architecture.

The majority of the savings is driven by the vastly reduced fiber count requirements, as well as the associated labor and infrastructure to support the smaller cables associated with TAP deployments.

Fulfilling the Mandate—and Making the Business Case

As service providers step up to the challenge of making universal connectivity a reality, they are playing a large role in helping the U.S. Government fulfill their mandate to ensure every citizen has reliable, affordable access to broadband connectivity—one that so many of us take for granted.

To lack broadband connectivity is to be excluded from much of modern living. Bringing this vital utility to underserved rural communities is a noble undertaking, and with the smart application of TAP architecture to speed up deployments and drive down costs, it can truly be a feasible undertaking as well. ■

REFERENCE

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How the U.K. Can Speed Up Its Fiber Rollout Without Compromising on Sustainability

Using technology to ensure fiber projects align with the need for a sustainable future.

BY XAVIER RENARD

The U.K. telecom sector is trying to deliver against the entwined targets of increasing the number of homes able to access gigabit connectivity and keeping carbon emissions as low as possible.

Ofcom reports¹ that almost 75% of homes have access to gigabit-capable broadband, yet the U.K. still lags behind² its European neighbors when it comes to homes passed by fiber. In rural areas, the challenges of rolling out FTTH are magnified³—just 40% of rural premises are now gigabit-capable, compared to 80% in urban areas.

In rural areas, traditional fiber rollout practices are too costly to both install and maintain and alternatives like wireless have a high environmental price tag. Network builders need solutions that are built on innovation and designed for the specific requirements of the U.K. market and prioritize sustainability.

The Fiber's Greener on the Other Side

There are very clear business cases for telecom companies to prioritize the sustainability of their operations and networks. With a national push for sustainability and lower carbon emissions, consumer awareness of the environmental impact of each and every asset and product they use is growing. Today's customers and consumers often have "green" ideals near the top of their priorities, whether that be in their homes or part of business projects.

A solid sustainability profile can also improve a company's standing before investors. A transparent record of carbon emissions and a provable ESG strategy and reporting will find it easier to attract funding as more investment firms identify ESG as a priority.

The same goes for public project tenders. In 2013, the U.K. became the first country to make it compulsory for companies to include emissions data for their entire organization in their annual reports. Last year, it became the first G20 country to



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make it mandatory for firms to disclose climate-related financial information. Though this applied to large companies, the trend is clear and network builders shouldn't be surprised to find proof of carbon offsetting a prerequisite for contracts.

Better sustainability practices can also deliver lower energy usage. Energy consumption constitutes between 20-40% of a network's operating expenses, according to the GSMA. By reducing the energy consumption of their networks, operators can make significant cost savings. To unlock the potential of these savings, operators need to measure the sustainability of their networks all the way to the core. They have adopted the likes of Life Cycle Analysis concepts which consider all the life stages of a product, in order of the extraction of the raw materials, the manufacture of the product, the transportation involved, and its end of life.

Adopting and effectively communicating environmental policies creates reputational benefits that can generate further long-term business value. The evolution of sustainability strategies can also open new avenues and revenue for telecom service providers. For example, research by Boston Consulting Group has shown that younger consumers are willing to pay a 10% premium for sustainable "green" telco products.⁴ To reap these benefits and reduce emissions in their supply chains, service providers can negotiate with vendors to set their own renewable energy standards and targets.

So where in the business can telecom companies implement more efficient practices and what technologies can be adopted to help? From cutting operational emissions, for example reducing the number of visits to network sites in gas-guzzling vans, to using networks that need less raw material, the possibilities are many. But U.K. telecom companies must consider the best options and ensure that rural locations aren't left behind.

The Rural Challenge

The dispersed nature of a rural area is the greatest hurdle that service providers must overcome when connecting houses, buildings, and businesses. Data must travel further to reach the end user. These isolated environments also mean that maintaining and repairing a fiber network is more challenging.

Wireless connectivity such as 4G and 5G can be great options in rural areas, as they can navigate the rough and robust terrains that separate the amenities much easier than cable. Somewhat surprisingly however, for the same amount of data, a 4G mobile network consumes 10 times more energy⁵ than fiber.

Operators have access to existing infrastructure in many rural areas, which if used can significantly lower an operator's impact on the environment and time to deploy new networks, compared to strenuous digging and new installations. By upgrading these existing legacy networks—such as copper—to future-proofed technologies such as FTTH, companies can considerably reduce their energy dependencies.

Physical Infrastructure Access (PIA) is one solution for fulfilling the need of boosting high-capacity broadband around the world. PIA provides service providers with the opportunity of

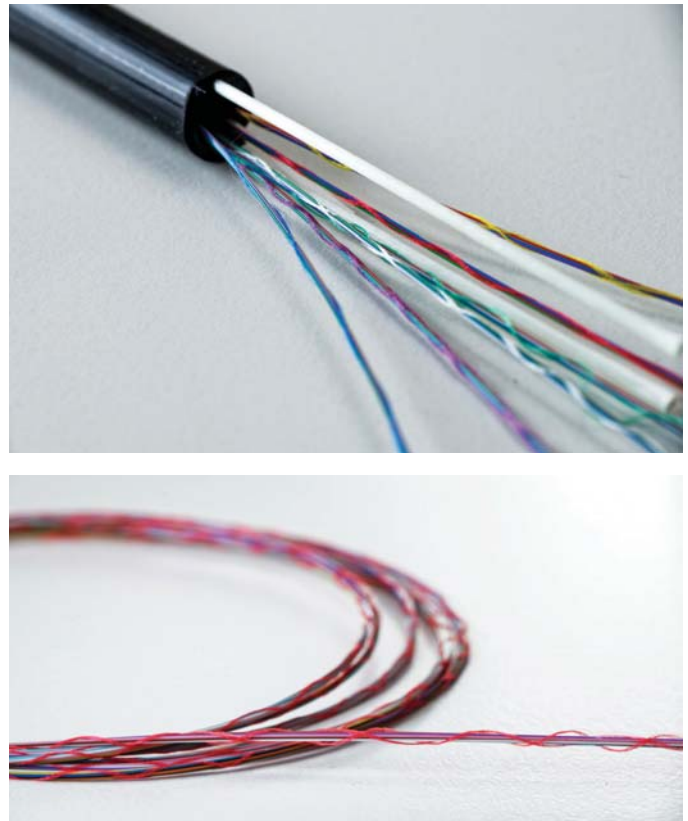


FIGURE 1

fiber installation in the access network via the incumbent operator's ducts and poles. However, operators who wish to use PIA infrastructure must comply with rules such as cable breaking loads and cable size.⁶ These two constraints create a significant challenge to cable design and consequently limit the number of fibers that can be contained within a cable sheath that contains breakable strength members.

The market, therefore, needs innovative solutions that enable operators to cut emissions but are also cost effective and high performing.

Small in Size, Big in Environmental Impact

Many leading fiber network bodies are aiming to point the industry toward a more sustainable future. The FTTH Council Europe, for instance, has created a sustainability committee⁷ with the aim to promote full fiber as the most sustainable access network technology—and an enabler of multiple applications which can also contribute to reducing the carbon footprint of our activities, such as remote working. It has called for the industry to work collectively⁸ to support one another and make their respective activities more carbon neutral.

By analyzing the overall impact per subscriber in a PON architecture,⁹ the "transportation" part only represents 5% and the "distribution" part 60%, but the "connection" part alone represents 35% of the overall carbon impact of the passive architecture. For a single-fiber connection cable, the carbon impact of the cable can be up to a hundred kilograms of CO₂ equivalent per kilometer, but the

Courtesy of ACOM Group

fiber itself only accounts for around 2-3% of this. The rest comes from the protection elements surrounding the fiber.

ACOME Group, a member of the FTTH Council Europe's sustainability committee, has designed a cable with PIA Compliance in mind, that also enables cost savings and greener operations in a number of use cases.

Its patented Nanomodule technology enables ACOME to manufacture cables that mirror the existing architecture of fiber infrastructure—cables made up of 12 modules. Due to PIA compliance and its restriction on cable size on existing poles, many installers have been forced to move from the conventional 12 fiber per module to 24 fiber per module. ACOME's Nanomodule is able to maintain modules of 12-fiber, thanks to its density, which is 30% smaller than traditional cables (See Figure 1).

By maintaining modules of 12 fibers, installers can more easily identify the color of the cable being put into a rack and they can avoid additional fiber management. In addition, by maintaining 12-fiber modules, traditional splicing boxes can be used, allowing greater standardization of products, and guaranteeing optimized costs. Not only does this enable faster and easier installations, but it also offers a decrease of 15kg CO₂ equivalent per kilometer per module compared to micro loose tube and even more when compared to other current dense structures.

The Nanomodule technology also addresses key pain points that installers face helping to reduce installation times by an average of three hours and countless hours of maintenance times for every kilometer of cable deployed. This is because the cable is grease and gel free,¹⁰ making it easy to handle and install and eliminates the need for fiber cleaning. As the technology does not require any fiber cleaning solvents, operators can avoid waste pollution from both the sealing and cleaning substances that are needed to maintain traditional cables.

The Nanomodule design saves thousands of pounds per kilometer deployed in cost savings and one ton of carbon per three kilometers of cables that are installed, calculated by ACOME.

Fit for Tomorrow's Networking Needs

If operators take the time to assess their impact and evaluate their decisions regarding the environment, they can set clear goals for the future and follow strategies to implement positive changes to benefit their customers and the planet.

With innovative products from the whole fiber industry, operators can continue to commit to their environmental plans and legislative demands, while also cutting costs. It is possible to act and innovate on all stages of a product's life cycle in order to minimize its carbon impact. Whether it be the choice of materials, the production processes, the packaging or the distribution, each choice can have a positive impact on the environment. ■

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Tools for Surviving the Golden Resignation



What the Biggest Network Challenge Means for Businesses and How Out of Band Can Help

BY ANALISA DOMINIC

Most are aware of the Great Resignation (or Big Quit) of 2021, where employees voluntarily resigned from their jobs amid the COVID-19 pandemic. However, many are not as familiar with the imminent Golden Resignation. This economic trend refers to the projection that a considerable portion of network engineers will retire in the next few years, having significant implications.

The Golden Resignation couldn't come at a more inopportune time. A Gartner survey¹ found that demand for technology talent still significantly exceeds supply, with almost 86% of CIOs reporting greater competition for qualified candidates. A deeper analysis of the Golden Resignation,² conducted by Censuswide on behalf of a leading Out of Band management solutions provider, discovered that 86% of U.S.-based CIOs surveyed expect at least 25% of their network engineers to retire in the next five years. This global study, conducted in 2023, surveyed 502 CIOs and 510 network engineers in the U.S., the U.K., France, Germany, and Australia, asking separate but complementary questions.

Perhaps the most important takeaway of the Golden Resignation is that the ever-shrinking pool of technology talent—particularly network engineers—calls into question the integrity of networks for today and the future. Faced with the reality of the Golden Resignation, it is paramount that companies begin to prepare accordingly, incorporating new network solutions like Out of Band Management to support their limited staff.

The Dangers of Operating with a Diminished Network Team

Today, round-the-clock access through resilient business networks is essential for employees throughout an organization to use resources and perform routine tasks. Nevertheless, maintaining a network and

ensuring it has optimum uptime and minimal downtime is challenging. Resilient networks require hands-on management from a dedicated team of network professionals—professionals who happen to be retiring en masse.

The worsening skills shortage of network engineers is already causing trouble for businesses, with nearly every CIO surveyed saying that a decrease in engineers resulted in an inability to manage networks. Failure to maintain acceptable service can degrade the customer experience, causing many to take their business elsewhere, negatively affecting profits and rapport.

Due to the proximity and understanding of network engineers, they are deeply aware of the potential weakness of their company's network. Consequently, less human oversight of one's network can make it more susceptible to exploitation by cybercriminals. When asked to identify the main cyber threats to their business, U.S. CIOs ranked malware, spam and

“

“47% of U.S. CIOs and engineers identified the ability to complete network-related tasks remotely as a top initiative to address the talent shortage.”

phishing, social engineering, and insider threats as the most concerning. These leaders' fear is unsurprising, given that the average cost of downtime (including lost productivity and revenue, and IT labor and post-attack expenses) caused by a ransomware attack is \$5.1 million per organization, according to CyberEdge Group.³

Interestingly, despite CIOs' increasing IT budgets, 59% of U.S. network engineers believe that insufficient investment has increased the risk of cyberattacks and downtime, which will only exacerbate as these professionals retire. This issue is prevalent enough that 27% of U.S. network engineers may leave their businesses because of insufficient funding. With 98% of U.S. engineers admitting to having to achieve more with fewer resources in the past three months, these departures and looming retirees will jeopardize the safety and robustness of networks further.

How Out of Band Benefits Short-Handed Personnel

One solution businesses can leverage to alleviate pressure for short-staffed IT teams is Out of Band management. This provides a secure, remote connection to IT network environments during outages or disruptions in communications to the primary WAN/LAN. Out of Band technology includes serial console servers, which open an alternative pathway via a separate management plane, allowing network engineers to remediate physical and virtually connected devices.

Out of Band management is a much-needed boon for depleted teams, as it enables them to restore networks through remote access to a backup quickly. Additionally, Out of Band management will help engineers increase overall resiliency and flexibility, saving their companies from suffering the usual lost resources and revenue brought about by outages. This technology is also invaluable for first-day initial deployment and everyday network management.

It also empowers engineers to lock-down network elements and restrict access from any location during cyberattacks. For example, if a breach occurred due to

malware or ransomware, engineers could use the console port to disable access to impacted network equipment, thereby isolating the incident. In addition to shutting down servers to protect private data, engineers can disconnect WAN connections to isolate a breach further; likewise, should engineers be unable to regain control of certain network assets, they can power off using remote PDU control capabilities. Also, engineers can use Out of Band management to reconfigure devices to factory default and later rebuild them through the console port.

Additionally, it can accelerate various network processes. In particular, the ability to deploy, manage, and remediate business networks remotely provides reduced IT teams more time to focus on other critical tasks, such as business performance and customer satisfaction. Similarly, Out of Band management makes networks better adapted for hybrid employees, as engineers can securely access and manage the network from any location. In fact, 47% of U.S. CIOs and engineers identified the ability to complete network-related tasks remotely as a top initiative to address the talent shortage. Organizations can also use Out of Band technology as a recruiting tool because it expands geographical reach, provides flexibility to busy workdays, and presents a valuable upskilling opportunity to engineers.

An Investment Today Is Money Saved Tomorrow

Out of Band solution providers incorporate automation, AI, and other emerging technologies like 5G into their offerings. Most CIOs and engineers believe that such technologies will be crucial to overcoming the tech skill shortage brought on by the Golden Resignation. For example, in the case of automation, businesses can establish automatic configuration and operation of network infrastructure in

data centers and remote edge locations. Likewise, Out of Band solutions permit companies to set up automated alerts, which send SMS notifications to engineers concerning IT infrastructure; plus, network solutions, like failover to cellular, will automatically prevent downtime.

Concerning 5G, best-in-class Out of Band offerings—including Opengear's *Smart Out of Band* solution—can support resiliency in 5G-powered networks and edge locations. While only 53% of U.S. engineers fully rely on 5G for remediation of network issues, 5G deployments empower them to enhance the end-user experience, boost revenue, and improve process efficiencies. Nevertheless, investing in new technologies, like automation, AI, 5G, and—most notably—Out of Band, is a difficult decision today for businesses. The ongoing economic downturn squeezes budgets, making companies believe that investments in new technologies are luxuries they cannot afford. Although this hesitancy from businesses is understandable, ultimately, the benefits of Out of Band will quickly outweigh any losses incurred from downtime. ■

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2023's Emergent Trends in Enterprise Telecom

Dennis Thankachan of Lightyear explains the trends and shifting priorities in enterprise telecom purchasing they discovered in 2023.

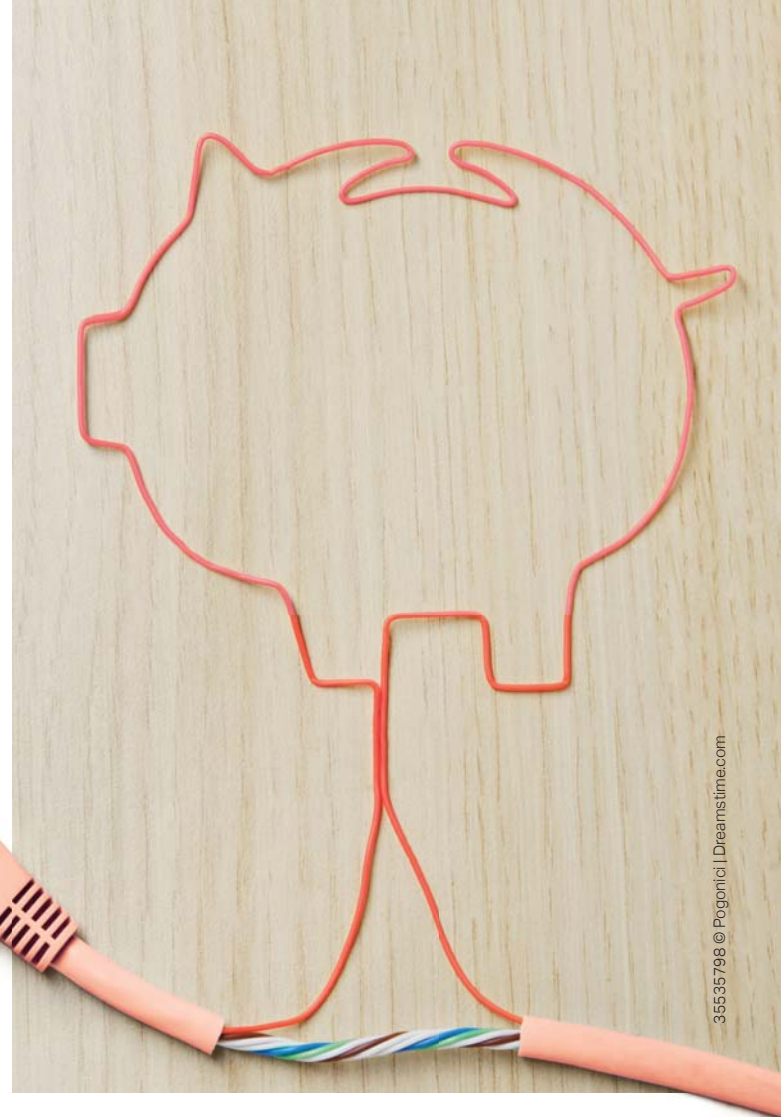
BY DENNIS THANKACHAN

2023 has presented enterprises with quite the set of hurdles and opportunities to manage through: inflation, interest rate hikes, innovation in AI, supply chain ups and downs, and so much more. At Lightyear, we observe firsthand how macro trends and new technologies directly impact enterprise technology purchasing decisions because our company helps enterprises optimize their telecom procurement with software. Here, I'll run through a few of the most salient trends we've observed this year around enterprise buying.

Network Procurement Shift from Expansion to Cost Optimization

In 2021/early 2022, a majority of network procurement requests coming through Lightyear's platform were around network or facilities expansion, along with a continuation of COVID-19-related operational changes. Naturally, in an environment where capital was freely available and the economy was running hot, companies were expanding rapidly.

Coinciding with changes in interest rates, inflation, and the global economic outlook, in mid-2022, enterprise procurement requests on our platform shifted heavily toward network consolidation and cost optimization among enterprise clients. Rather than buying new services, enterprises began scrutinizing network budgets to get rid of unnecessary services, accelerate technology changes that could cut costs, and rebid services where cost cuts appeared plausible.



Here are a few of the most common cost optimization trends we've observed within our user base:

Acceleration of Complex Cost-Saving Network Transformation Projects

Examples include shifting from an on-premises voice system to a cloud-based voice system or sunsetting an MPLS network in favor of SD-WAN overlay and internet connectivity underlay. These changes can reduce network costs, sometimes significantly, but also involve potentially gnarly implementations with many moving parts and sometimes many vendors. In an environment where costs mattered less, enterprises were more likely to avoid these technology changes.

Aggressive Cost Benchmarking, New Vendor Introductions, and Bulk Procurement

Enterprises are sharpening pencils on ideal cost benchmarks for network services (often utilizing target \$ / Mbps) and utilizing a variety of procurement tactics to hit cost targets. We've seen enterprises become more willing to embrace new vendor MSAs to increase RFP competition and buying services in bulk to take advantage of potential discounts. Software tooling and datasets that can help enterprises accomplish these tasks have been en vogue.



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Investment in Better Organization Aimed at Rationalizing Unnecessary Services or Capacity

Enterprises often utilize spreadsheets, internal systems, or sometimes nothing at all to track network services within their footprint, often leading to disorganization. These systems require manual input to stay on top of service details and can lead to renewal deadlines getting missed or continued payment for services that are no longer needed. We've seen a big enterprise push to get organized with more dynamic software with the objective of disconnecting unnecessary network services, reducing capacity where possible, and taking advantage of renewal optimizations.

Overall, in 2023 we've seen enterprise CIOs more willing than ever to embrace potential change to achieve cost savings.

Going from SD-WAN 1.0 to SD-WAN 2.0

Enterprise SD-WAN conversions began in the early 2010s, coinciding with widespread availability of high-speed broadband, allowing enterprises to orchestrate site-to-site traffic over the public internet at much lower cost and higher flexibility. Over the course of the 2010s, enterprises that had generic WAN use cases mostly turned down MPLS networks in favor of commodity internet underlay and SD-WAN overlay. Today, we are most of the way through this SD-WAN transformation within the enterprise.

More recently, enterprises have seen their WAN needs change:

- Enterprises have seen the perimeters of their WAN shift to accommodate many more devices and endpoints, especially with the advent of remote work.
- Enterprise applications and data have shifted primarily from the premise to the cloud.
- There has been a significant shift in the cybersecurity threat landscape with a huge increase in potential surface area of attack. Today, enterprises are re-evaluating their WANs, and seeking network topologies that align with these trends—vendors that have robust middle-mile networks, security offerings embedded within their SD-WAN offering (SASE), and more cloud-centric reporting and orchestration capabilities. There is a “new school” of SD-WAN vendors emerging that have built their businesses around the above needs, and we now see enterprises sunsetting SD-WAN “1.0” vendors in favor of this new breed of SD-WAN vendors. Although the first wave of SD-WAN transitions is mostly complete, this wave of SD-WAN conversions has only just begun.

Satellite's Entry Into the Enterprise WAN

The first generation of satellite ISPs were not passable as primary, or even backup options, within enterprise WANs because reliability, latency, and speed were significant problems due to sheer distance traveled (from earth to satellite and back) and antenna technology utilized. In 2022, Starlink introduced low earth orbit (LEO) satellites with improved antenna technology that provided performance comparable to a terrestrial broadband connection, but with global reach.

We are currently seeing a major uptick in requests to utilize Starlink as a primary or backup connectivity option in rural or

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“Rather than buying new services, enterprises began scrutinizing network budgets to get rid of unnecessary services, accelerate technology changes that could cut costs, and rebid services where cost cuts appeared plausible.”

underserved areas where high-speed broadband or dedicated fiber is unavailable. Previously, satellite options were not explored for these use cases. We've also seen a big push from ISPs to resell managed versions of Starlink, with enterprise level support options being offered alongside the baseline service.

From Public Cloud Back to Private Cloud

From the mid-2000s to today, enterprises have largely shifted data storage and compute from the premise to the public cloud, as the public cloud offered significant improvements in ease of use, flexibility, and ease of maintenance with lower risk of technology obsolescence. However, as public cloud utilization has grown, enterprises have observed that cost curves for public cloud utilization scale non-linearly, meaning the highest-usage enterprises often pay a significant premium to run things out of the public cloud. Also, the public cloud is best built for commodity compute and storage use cases but often doesn't offer the flexibility required for highly customized or intensive workflows (today this is of most relevance to artificial intelligence).

As enterprises rationalize budgets in 2023 and emerging companies build infrastructure around AI, we've seen a push toward private cloud and hybrid cloud infrastructure relative to years past. When workloads can be run more cheaply in a private cloud instance, or significant customization or flexibility benefits a workload, private cloud is winning. Compliance and security posture are also easier to customize and document in a private cloud environment. In the long run, workloads will live where they operate most efficiently from a cost and performance perspective.

So, What's Next?

COVID-19 prompted a wave of accelerated digitization, and the recent economic downturn appears to be prompting another wave of acceleration toward cost-saving digitization. Although macro circumstances are likely to continue to dominate enterprise decisions in 2024, it'll be interesting to see how AI and other new technologies impact things. ■



Dennis Thankachan is the CEO and Co-Founder of Lightyear. For more information, visit lightyear.ai/. Follow Dennis on LinkedIn: linkedin.com/in/thankachan/. Follow Lightyear on Twitter @lightyearai and LinkedIn: linkedin.com/company/lightyearai/.

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