







Topic: Profiling Bandwidth Consumption

Background: The proliferation of high-end handsets, tablets, and laptops on mobile networks is a major traffic generator, because these devices offer the consumer content and applications not supported by previous generations of mobile devices. According to a report, "Cisco VNI Mobile 2015", (http://www.cisco.com/c/en/us/solutions/service-provider/visual-networking-index-vni/index.html), a single smartphone can generate as much traffic as 37 basic-feature phones; a tablet as much traffic as 94 basic-feature phones; and a single laptop can generate as much traffic as 119 basic-feature phones.

Question: All of this ultimately converges onto the wireline networks. What changes and challenges do you see in the next 18 months across the wireline network, data centers, and vendor requirements as a result of this?

Topic: Copper's Demise

Question: With VDSL, vectoring, and other technologies that can extend its lifeline, what is your opinion about the real demise of copper?

Topic: FTTx Construction and Engineering Challenges

Background: One of the primary challenges to ultra-broadband expansion is the high capital cost of network construction. Whether leasing assets, conduit, or installing underground and/or aerial networks, the expenses ratchet up from there. Add in timeframes for permitting, inspections, and turn-up, and you can see how network construction costs can skyrocket. And remember, that's if everything goes as planned.

Question: Given these things, are there any new construction processes, efficiencies, or labor saving tactics on the horizon you believe will help lower providers' overall FTTH investment?

Topic: Leadership

Question: What is your approach to leading your teams, and what is different about it than that from other leaders? Is there a "secret sauce" to your method? What advice would you give to readers who want to be future Game Changers and telecom leaders?



Randy Frantz

Director, Telecommunications Solutions, Esri

Small Cells

Selecting the proper installation site for small cells requires a very detailed, granular analysis due to the limited range of small cells. GIS makes it possible to analyze all critical site-selection factors of an area (e.g., existing coverage quality, high-bandwidth demand, proximity to power, backhaul access). The strength of GIS is its ability to access, ingest, and analyze multiple sources of spatial data.

Many companies are creating GIS-based models to integrate factors like pedestrian traffic patterns into their analysis, and then providing digital, street-level imagery to engineers who can plan and design their network without a costly field visit. To realize the full coverage and savings promised by small-cell proliferation, GIS becomes a critical tool.

FTTx Construction and Engineering Challenges

One trend is already significantly reducing costs and timeframes for construction: automated planning and engineering processes. Engineering and construction companies are increasingly using aerial imagery to replace costly field visits for fiber and backhaul planning. Once the FAA limits on commercial drone use is removed, the ability to deliver engineering-quality digital imagery will increase dramatically.

In the not-too-distant future, we will see smart systems identifying potential routes, initiating field data collection, and designing and permitting a network with minimal oversight from an engineer. This new world will greatly reduce the manual processes (e.g., data collection, route selection, design and permitting) too many companies still follow. Automating these processes will greatly enhance their engineers' productivity.

Leadership

Theodore Roosevelt once gave timeless leadership advice: *The best executive is the one who has sense enough to pick good men to do what he wants done, and the self-restraint to keep from meddling with them while they do it.* Providing your teams a clarity of vision and getting their buy-in in return is crucial. Step one is to offer a broad vision, which your team can modify and adapt, so they feel ownership. Too often, the tendency of an aspiring leader is to force a vision and then micromanage its execution. I am ever impressed by the talent people possess and -- when given the opportunity to use it -- the results they deliver. If you truly want to change the game, build a bond with your team. Then trust them, and they will you.

Randy Frantz is Director, Telecommunications Solutions, Esri. He has more than 31 years of experience in telecommunications engineering and operations. Learn more about how other telecommunications companies are leveraging GIS to plan networks and improve their business processes at esri.com/telecom. For more information, email rfrantz@esri.com.

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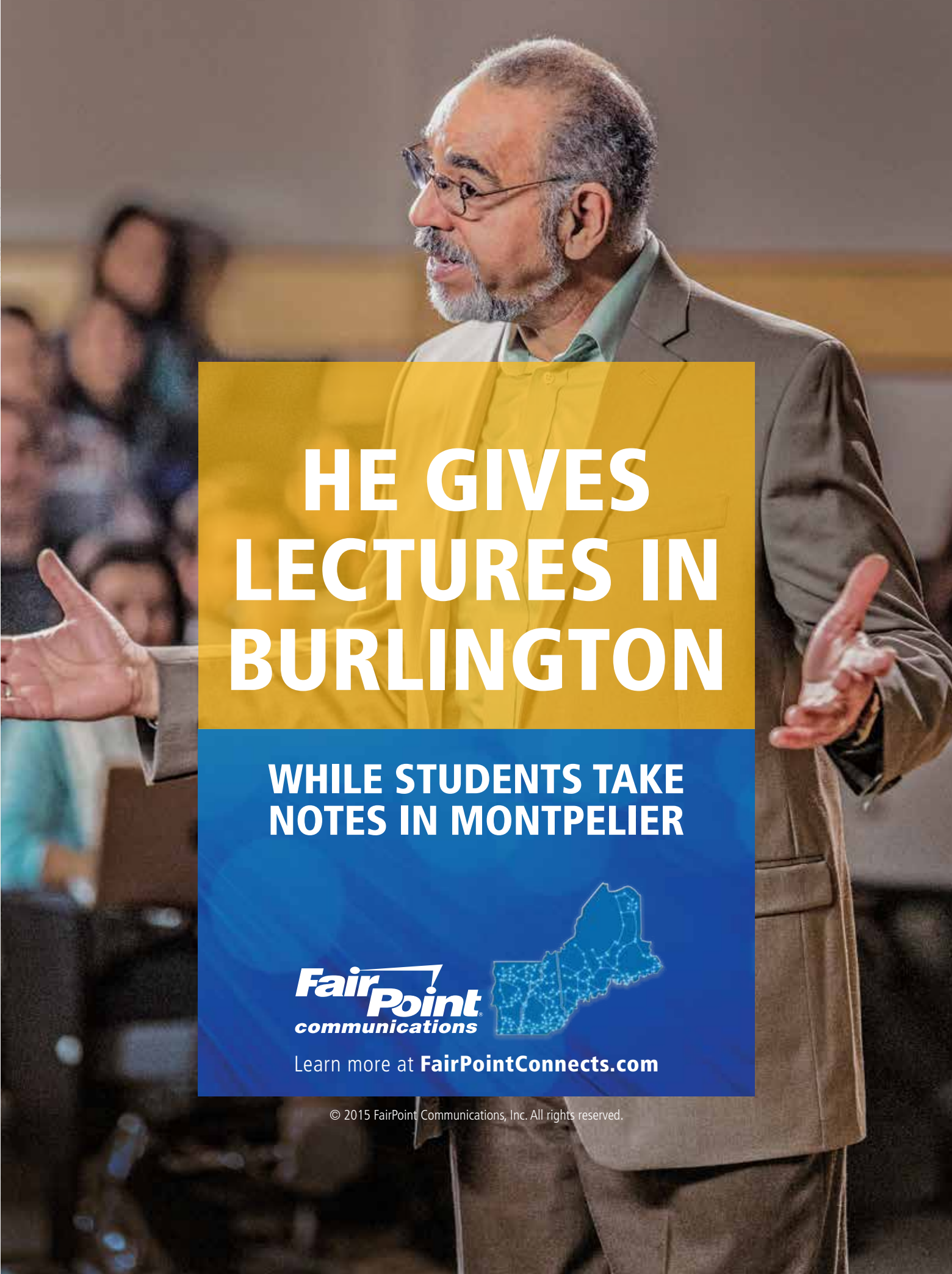

Google fiber

Gabriela Simmons, EI, PMP

OSP Engineering Program Manager
Google Fiber

Leadership

In order to achieve results and make an impact, you have to do everything you can to empower each and every person on your team, in a way that complements each individual's personal preferences and strengths. Doing so will encourage them to take ownership and take action, and to go the extra mile. Don't micromanage, but do make sure your team has the necessary resources, and provide assistance with the removal of roadblocks. It will improve how our teams make decisions and adapt to change. That said, it's important to create a vision, and, even more important, to clearly communicate it. Make sure your project portfolio is in sync with the company's greater vision, and in the long run you'll realize that vision along the way. Inspire, coach, and contribute your energy, excitement, and enthusiasm -- it will pay off. I have found that doing this fosters teamwork, as well as the creation of a healthier, happier, and more effective teams.

Network Quality

Demand for faster Internet is increasing as more of the things people love to do online require more bandwidth -- from gaming to video chatting to watching movies and more. Unfortunately, using today's connection speeds, we often get stuck waiting for uploads or for that little buffering wheel to go away. Statistics show that these delays are so disruptive that we're more likely to walk away from slow-loading sites.

In order to ensure our customers have reliable broadband, Google is working to build and operate a quality network and improve the overall health of broadband Internet access services in all of our Fiber cities. The best thing we can do is build our network and our business in a way that allows us to remain agile and able to adapt to people's bandwidth needs.

FTTx Construction and Engineering Challenges

Google has lots of computing power -- and we try to use that power to help us design, build, and ultimately scale the network design and construction faster. That is why we are actively building teams of talented professionals, and developing tools that balance scalability, reliability, performance, and economics. These tools will ultimately give our workforce a competitive edge.

Gabriela Simmons, EI, PMP, is an electrical engineer, specializing in communications, and is a certified project manager. Gabriela has worked in OSP engineering for 9 years, managing projects of diverse scope and size. Prior to that, she worked in engineering consulting. Gabriela is originally a Miami native, but also lived in Venezuela for many years. At Google Fiber she's a program manager for OSP engineering standards and quality assurance. She can be reached at simmonsg@google.com.

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Google fiber

Jason Koenders

SVP, Chief Technology Officer, Integra

Small Cells

When we talk about the growth of small cell solutions, it starts with what's driving that demand. The short version is to improve coverage. The longer version is that the ever-increasing demand for bandwidth is pushing the limits of customers' infrastructure, and mobile operators are looking to improve spectral efficiency. While we are in the relatively early stages of small cell deployment, we do see it as a significant growth area and a strong opportunity to edge out our existing fiber plant as it aligns with our strategic growth objectives. The sweet spots we are exploring are the enterprise and urban sectors where we see key synergies with Integra's dense metro fiber footprint in the western regional markets that we serve.

Copper's Demise

Our long-term strategy is focused on investment in fiber infrastructure; in the meantime, copper remains a very strong play for us, given our ability to seamlessly extend high bandwidth services over existing copper throughout our footprint. Investment in R&D remains significant as it relates to copper-based technologies, and justifiably so, since the penetration rate of fiber into commercial buildings was 42.5 percent in 2014, according to Vertical Systems Group (http://www.verticalsystems.com/). The growth rate is up considerably from 10.9% in 2004; however, there are many commercial properties in which the only existing option is copper. We will continue to optimize the copper facilities available to best serve our customers, while investing heavily in the expansion of our fiber network. In the coming years, we anticipate copper will be supplanted by fiber and its characteristics for bandwidth performance, stability, and quality of service.

FTTx Construction and Engineering Challenges

In an effort to expand our fiber network and reach with the same CapEx while delivering the capabilities our business customers expect, this is one area that gets consistent attention. There are many components to the decisions around FTTx construction and engineering such as using internal employees vs. contractors, single-source supplier vs. multi-supplier, aerial vs. underground, etc. Those who work rigorously at driving the costs down can find significant opportunities to reduce costs and boost ROI, without sacrificing the quality or serviceability of the build or the customer experience. While I don't see a single magic bullet to accomplish savings, at Integra we have utilized each of these to continue to do more with less.

Jason Koenders is SVP, Chief Technology Officer for Integra. Jason originally joined the company in December, 1998 and is responsible for network architecture, engineering, application development, security and product. He brings more than 17 years' experience in the telecommunications industry where he has led major network design, expansion initiatives, and key integration activities for the ELI and Eschelon acquisitions by Integra. Jason has a BS in Business Administration from the University of Phoenix.

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Susan Schramm

VP Sales & Marketing Effectiveness and Global Channels, JDSU

Gigabit Efforts in the Real World

One of the challenges surrounding Gigabit communities is that they create even greater complexity across the network. You have the benefit of unprecedented capacity delivered right to the home, but you also depend on sometimes spotty Wi-Fi, for instance. What does that mean for the technician on the ground, who is working to ensure the customer receives the perfect end-to-end experience? Complexity.

This isn't just about the transformation of the network -- it's about the transformation of the people. As we evolve the networks we also need to evolve skill sets. As you give those who support networks more information and skills, they're going to be able to solve problems faster.

It's a mixed blessing. We're enabling the Gigabit world with new applications, and increasing demand for much higher speed networks; but it means complexity and change. From a career point of view, people involved with delivering the promise of Gigabit communities are going to need to build skills and competencies to become more "value add" in that type of environment.

Network Quality

Well, the good news is our company offers solutions that help you solve these headaches. This is a major challenge that almost all of our customers face, whether they are trying to manage wireline, wireless, in-home, or, more frequently, a combination of networks and services.

It all starts with installation. There is no substitute for getting video installation right the first time, every time. And accurate visibility into a subscriber's quality of experience defines customer satisfaction. Systems must also provide actionable intelligence, allowing operators to reduce mean time to repair and operating expenses while also providing valuable information for marketing new services and offers tuned to demographics and, ultimately, individuals.

Video gives operators a great opportunity to increase revenue but only if they can expand and retain customers.

Profiling Bandwidth Consumption

We can all probably agree that the network is rich with information to address this challenge. We now have what it takes to create networks that "adapt" according to where and when bandwidth is needed. However, we also need:

- Flexible, scalable, near real-time collection of information, right at the edge of the network. JDSU (soon to be Viavi Solutions) is actively involved in moving intelligent collection to the edge of the network, both with revolutionary devices, and by moving our proven geolocation technology to edge computing platforms.
- Scalable platforms to manage all of this data. It needs to be turned into meaningful insights that can be distributed and consumed by many, many applications.

Susan Schramm is responsible for maximizing the impact of JDSU's customer-facing organizations as they help customers create value through their network and services. Her scope includes global channel management, sales operations, strategic marketing, marketing communications, as well as competency development for direct and indirect sales channels. Susan joined JDSU's executive team in 2014. Previously, she held executive positions leading sales, marketing, and corporate affairs as well as transformation initiatives for Nokia, Siemens, and IBM. Susan served as an executive board member with both TIA and ATIS.

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Jeff Lee

Plant Manager, Norvado

Gigabit Efforts in the Real World

Norvado launched Gigabit Internet to two-thirds of our subscriber base currently on FTTH in 2014. At the time of our Gigabit Launch, Norvado was one of only a handful of cooperatives in Wisconsin offering gigabit speeds to subscribers. At this time our take rate is minimal, which may be attributed to several reasons, including price and customer need. One challenge for all gigabit speed providers is the need to educate the customer base on the opportunities that type of speed can create. While most of Norvado's Internet subscribers are on speeds between 10 Mb/s and 30 Mb/s, the explosion of IoT will soon make much higher speeds the norm.

Leadership

In the beginning, it starts out by being a leader when no one is watching. In the telecom industry, you need to be passionate about the services you offer. Meeting and exceeding the needs of customers, both internal and external follows. Eventually, the rest will naturally come as you lead by example with mutual respect for those you work with. Setting individual and team goals and being fair, but firm, with expectations, helps to hold you and those you supervise accountable. One of my favorite accomplishments as a leader of Norvado's Installation Group is the annual customer satisfaction campaign. During the campaign, customers are given an anonymous 5 questions scorecard to complete regarding the installers performance, professionalism, timeliness, etc. This program is in its 5th year and the Norvado Installation Group has seen satisfaction percentages increase every year. In 2015, the installers finished above a 99 percent satisfaction rating. A customer satisfaction survey ensures you are meeting customer needs and also sets expectations, maybe that is some secret sauce for customer-approved installations.

Copper's Demise

Until copper Cat5 and Cat6 are no longer used in the premises and are replaced by fiber or wireless, there will still be good reasons to enrich and maintain the copper end loops through FTTX concentrators while buying time to build FTTH. While many people believe copper is a dead technology, I believe many short loop plants copper still serve the needs of a majority of users. With speeds of 100/20 up to 2k feet with VDSL2 bonding and with G.fast gaining momentum, already buried copper can buy some time as Norvado builds out the expensive end loop and fiber drop.

Jeff Lee is the Director of Operations at Chequamegon Communications in Northwestern Wisconsin. The company does business under the brand name Norvado, providing the Quad Play in 13 ILEC and several CLEC exchanges. He is responsible for Plant and Network Operations, a role he has held for the last 15 years. He has been with the Company for 35 years; and is an active member of the WSTA, WSTCA, NTCA–The Rural Broadband Association, and WIN; and is a program advisor for the Wisconsin Indianhead Technical College Broadband Technologies program. He can be reached at jlee@norvado.com.

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Jennifer Sims

CEO, Power & Telephone Supply

Small Cells

As a supplier to the marketplace for over 5 decades, the impact of any growth area is related to our investment -- financially and more. Our objective is to bring value to service providers/operators, so making sure we are prepared to help meet their demand by having the right personnel, inventory, and technical resources is extremely important. Investing where our customers need us has always been a priority for Power & Tel, and we are actively doing so in the DAS, Wi-Fi, and small cell marketplace.

FTTx Construction and Engineering Challenges

Service providers are placing even greater emphasis on finding efficiencies within the supply chain. A FTTH project has multiple phases including design & planning; project administration; material procurement and delivery; and labor. Each phase has areas where efficiency can be gained and costs can be reduced. For many years, the ordering and proper staging of material was viewed as a necessary expenditure that was overlooked in terms of an area to reduce the overall project investment. But now, companies are placing greater emphasis on ensuring their supply chain is bringing value to their project and company. The efficient movement of the right products and data to the right place at the right time helps keep projects on-time and on-budget. There have been many technical advancements in logistic systems and tools that can aid in reducing the overall FTTH investment. Awareness and utilization of these improvements gives providers and contractors an added advantage.

Leadership

My approach is simple: clear vision, purpose, and communication with each other, frequently, and then, most importantly, know when to get out of the way. One of the differences in my approach is that I recognize that I am not always the expert and will look to those who are. I am very privileged to have an amazing team of highly experienced leaders at Power & Tel and our secret sauce -- well, it's a secret, so you have to call me to find out.

My advice to those who wish to make a difference in their field is to have a vision, set milestones, and then execute accordingly. Don't let the negative voices deter you from something you know to be true. Honesty, trust, and integrity still count. Just do what you say you're going to do, and pretty soon you'll make a difference!

Jennifer Sims is the CEO at Power & Telephone Supply Co. (Power & Tel). She is also currently serving as a Board Member/Treasurer of the TIA and an Executive Board Contributor for the QuEST Forum. Jennifer has an MBA with concentrations in finance and management of information systems from the University of Tennessee in addition to her BA in Communications from Vanderbilt University. Her business experience includes Northwest/KLM Airlines, IBM, HP, and over 10 years at Power & Tel. She can be reached at jennifer.sims@ptsupply.com.

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George Wakileh

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Gigabit Efforts in the Real World

As thirst for bandwidth rises and technology advances, increasing bandwidth at the point-of-use with maximum coverage while enhancing mobility of CPE becomes imperative. For greenfield and brownfield deployments, the focus becomes low service turn-up time requiring a medium-agnostic service deployment strategy. Our FutureLink™ G.hn Gigabit Ethernet connectivity is an example of a simple plug-and-play solution designed to connect all areas of the home by utilizing existing infrastructure and networking topology/media. G.hn technology distributes Triple Play IP services throughout the home with maximum QoS. A single device can support media sending a consistent signal to outlets -- even to those hard-to-reach rooms with common interferences -- and enhance wireless coverage. The combination of G.hn and MediaMAX™ enclosures with plastic wiring panels provide an ideal greenfield and brownfield solution for maximizing point-of-use bandwidth and coverage while minimizing installation time.

Network Quality

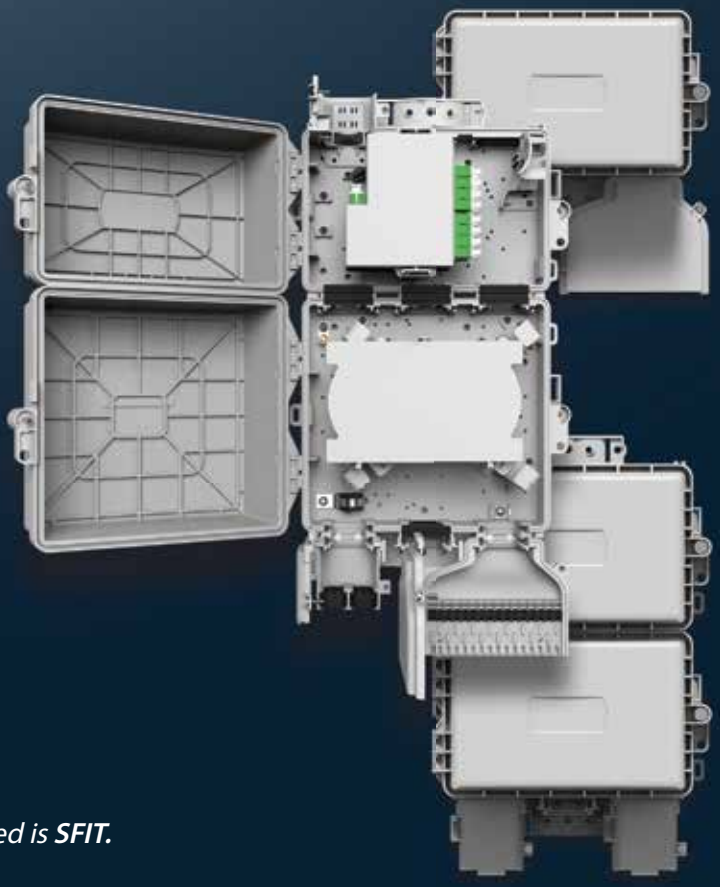
Providing reliable and high-quality service that delivers maximum bandwidth is the key to the best possible media/data performance and user experience. To this end, the focus will be on the entire network solutions -- from the Central Office through the Outside Plant and throughout the Premise. Utilizing compatible products tested for reliability with longevity in all environments is as important as ease of deployment, scale, craft-friendliness, and rugged plug-and-play features. Our FutureLink™ brand includes complementary, end-to-end solutions from high-density Central Office panels and frames, to compact indoor/outdoor terminal Hub systems with pushable fiber, to G.hn wired and wireless solutions with QoS profile that can be tailored to service providers' needs.

Leadership

We are experiencing a bandwidth-hungry competitive environment and the *Need for Speed* has never been greater! To satisfy the current demand, it is essential to align customer requirements and technologies with shorter realization cycles and fast, timely delivery of products and complete solutions. That's why at Suttle, we couple innovation with industry expertise to drive the development of our dynamic product platforms. Designing for today's demand, which must easily expand or upgrade to solve tomorrow's network needs, is the name of the game and the key to meeting the *Need for Speed*.

George Wakileh joined Suttle in 2009 to lead the company's global technology and business development efforts. He implemented strategic product innovation and companywide restructuring to provide solutions for today's high-speed connectivity demands. Mr. Wakileh has 20+ years in the telecommunications industry, and has been recognized as an innovative leader, strategic thinker, and industry expert who has expanded Intellectual Property offering and Patent Portfolio. For more information, contact George at george.wakileh@suttlesolutions.com.

If only you had a crystal ball to see the future



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Enrique Algaba

Director of Network Innovation and Virtualisation – Global CTO Unit, Telefonica I+D

Network Quality

Everybody knows that the communications industry is at an inflection point for how networks are designed, deployed, and operated. Service Providers must modernize network in order to be prepared for the explosion of mobile connectivity and data streaming by end customers where Network Quality becomes essential, as you remark in your question.

In this rapidly changing telecom industry, providers and operators are racing to find scalable, interoperable solutions that can be more easily deployed and managed across a network. This industry shift has led to unprecedented cooperation by industry leaders to develop standardized solutions to support the demand for data and Network Quality. The OTT and, in general, the digital world require both flexibility and agility, and technologies as Network Function Virtualisation hold the potential to transform telco networks substantially in this way for the better.

Profiling Bandwidth Consumption

Many Telecom Operators are taking into consideration the whole access network architecture as a result of this. For instance, FTTH deployments can help the reduction and consolidation of central offices, and moving the IP Edge closer to the customers can help to reduce the aggregation network.

Changes are focused in handling this traffic increase through the use of a greater number of Points of Presence. On the other hand, new technologies, as network function virtualization brings the opportunity to reconsider the kind of functionality needed and where they are needed. In this regard, Telefónica's trial of virtual CPE in Brazil is an opportunity to explore all these challenges: right access network architecture to cope with the traffic increase while becoming a more flexible and moldable future-proof infrastructure.

Leadership

From my point of view, the only way to understand leadership is as a skill that has to be offered to the team. A leader has to commit to a useful and worthy idea for the company and for the society, and then make everyone get involved in it. More than a secret ingredient I see key components: the ability of self-commitment, respect, trust, the capacity of experimentation, humility and, of course, the ability to run tasks and projects. And finally, a good leader always knows how to make others give their best. No secrets, just dedication.

Enrique Algaba holds a degree in Telecommunications from the Universidad Politécnica de Madrid. He joined Telefonica in 1988, since then he has held several positions of responsibility in the company as Director of Data and Multimedia Services, Director of Evolution and Convergence of Networks, Director of Networks and Service Platforms and Director of Network Technology, all of them at Telefonica I+D.

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Genia Wilbourn

Executive Director, Global Engineering Design & Transport, Verizon Wireline Network

Profiling Bandwidth Consumption

Keeping up with the bandwidth explosion is critical, so Verizon pre-determines select sites positioned for growth. This ensures the building and infrastructure are in place for timely turn-up of new equipment using optimal design. To meet the growth challenges, we rely on cutting-edge technologies. We now have more than 52,000 miles of 100G technology deployed on terrestrial and submarine fiber on our global ultra long haul transmission network. Last year we deployed 200G technology on a section of our network using coherent processors for better efficiency. And we're moving toward colorless, directionless, contentionless ROADMs, which offer quicker implementation by providing wavelength flexibility. Our Optical Transport Network optimizes functionality when it comes to switching, which ultimately leads to quicker provisioning across the network. Our goal is network availability to meet the increasing utilization of OTT services.

FTTx Construction and Engineering Challenges

The biggest cost factor in building an FTTH network is construction. One solution we are considering expanding is micro-trenching. Conventional trenching and undergrounding techniques require significant labor resources, and have significant impact on the community and environment. Digging up roads, closing lanes, costly labor hours, securing municipal permits, weather delays, and the significant cost of repairing roads are all cost considerations of conventional trenching. Micro-trenching reduces the labor required and the environmental impact, all of which allow Verizon to reduce construction costs and complete projects quicker.

Leadership

My primary focus as a leader is creating teams that achieve sustainable, extraordinary outcomes. Ensuring the right people are in the right jobs is key to delivering network performance results that win and delight customers as well as providing value to our shareholders. Setting the right goals and establishing razor-sharp priorities that are clearly understood at every level of the team are critical to success. I also believe that spending time in the trenches to learn the business from the "outside in" not only drives more informed decisions, but creates open dialogue across all levels and titles that fosters a culture of inclusion. Leading by engagement versus leading by compliance is a win-win, and results in both increased work performance and employee job satisfaction. My approach is to identify, develop, and strategically leverage talent combined with clearly communicating goals and priorities, maintaining an open dialogue across levels, and recognizing individual and team success. This approach has consistently produced outstanding results from the teams I've been privileged and proud to lead.

Genia Wilbourn is Executive Director of Global Engineering Design & Transport and is responsible for engineering design and capacity management across Verizon's wireline footprint. Prior to her current role, Wilbourn led Verizon Service Delivery & Assurance Global Operations, leading a team of more than 3,000 employees. Wilbourn holds a BS degree in civil engineering from Morgan State University. She is a graduate of both the Rutgers Executive Leadership Program for Women and the Master Series of Distinguished Leaders.

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AT&T Inc. (NYSE:T) is a premier communications holding company and one of the most honored companies in the world. Its subsidiaries and affiliates – AT&T operating companies – are the providers of AT&T services in the United States and internationally. With a powerful array of network resources that includes the network with the nation's strongest LTE signal as well as the nation's most reliable LTE network, AT&T is a leading provider of wireless, Wi-Fi, high speed Internet, voice and cloud-based services. A leader in mobile Internet, AT&T also offers the best global wireless coverage, based on offering roaming in more countries than any other U.S. based carrier, and offers the most wireless phones that work in the most countries. It also offers advanced TV service with the AT&T U-verse® brand. The company's suite of IP-based business communications services is one of the most advanced in the world. **www.att.com**

Clearfield delivers scalable, craft-friendly solutions that offer unsurpassed performance, while lowering the cost of broadband deployment. With its FieldSmart fiber management platform, CraftSmart OSP fiber enclosures, and FieldShield microduct and pushable fiber delivery and protection system, Clearfield sets the standard for fiber performance. FieldSmart is the industry's only fiber management platform designed around a single architecture -- the Clearview Cassette and xPAK -- supporting a wide range of panel and cabinet configurations that integrate with Clearfield's Clearview Cassette and xPAK. Passive optical components are integrated within the FieldSmart architecture for user-define split ratios and optimal resolution of fiber exhaust. FieldShield is a new fiber delivery and protection system aimed at reducing the cost of Last Mile broadband deployment and delivering fiber to environments previously not viable. CraftSmart is the industry's only field enclosure system optimized for fiber deployment. Clearfield's FiberDeep fiber patch cords guarantee performance at .2dB insertion loss. **www.clearfieldconnection.com**

Esri was founded as Environmental Systems Research Institute, Inc. in 1969 as a privately held consulting firm that specialized in land-use analysis projects. The worldwide headquarters of Esri are anchored in a multi-campus environment in Redlands, California. **www.esri.com/telecom**

FairPoint Communications, Inc. (Nasdaq: FRP) is a leading communications provider of broadband Internet access, local and long-distance phone, television, and other high-capacity data services to customers in communities across 17 states. Through its fast, reliable fiber network, FairPoint delivers high-quality data and voice networking communications solutions to residential, business, and wholesale customers. FairPoint delivers Internet services through its resilient IP-based network in northern New England. This state-of-the-art fiber network provides carrier Ethernet connections to support the surging bandwidth and performance requirements for cloud-based applications like network storage, disaster recovery, distance learning, medical imaging, video conferencing, and CAD/CAM, along with traditional voice, VoIP, video, and Internet access solutions. Additional information about FairPoint products and services is available at: **www.FairPoint.com**

Google Fiber is an Internet and TV service that provides Internet speeds at 1 gigabit per second -- that's up to 1,000 Megabits per second, compared to the average Internet speed in America today of 11.5 Mbps -- along with hundreds of HD TV channels. Google Fiber gets its name from the thousands of miles of brand new fiber optic cable we're building, right to people's homes. There's plenty of fiber optic cable in America already, but very little of it goes directly to people's homes -- so this means your Internet signal travels at Autobahn speeds for most of its journey, but then slows down as it gets near your house. Google Fiber aims to change that. Today, Google Fiber is offered in Kansas City, Provo, and Austin, and is considering expansion in 34 more cities across the US. **https://fiber.google.com**

Integra™ provides facilities-based communications and network services to enterprises, small and mid-sized businesses, government agencies and carriers throughout the western United States through its Integra Business and Electric Lightwave business units, with nationwide and international connectivity delivered via a robust IP/MPLS network. Integra's vast, privately owned network connects customers to 6,400 miles of long-haul fiber optic infrastructure and 3,000 miles of metro fiber across 35 cities in 11 states, and its Ethernet-over-copper infrastructure extends ubiquitous Ethernet access to more than 460,000 business locations. Customers trust Integra for secure, reliable, low-latency solutions to power high-bandwidth cloud services, data center connectivity and the applications that drive their success. Integra's services are backed by hands-on support and strong service level agreements.
www.integratelecom.com

JDSU offers industry-leading instruments, microprobes, and software to turn-up, troubleshoot, and optimize high-performance networks, and extends ROI with insight through solutions that collect and analyze data, revealing the true customer experience. JDSU is the world's leading network and service enablement company, providing unparalleled visibility and intelligence to manage and monetize the soaring growth of traffic, devices, and applications. JDSU innovates and collaborates with customers to build and operate the highest-performing and highest-value networks in the world. Our diverse technology portfolio also fights counterfeiting and enables high-powered commercial lasers for a range of applications. Learn more about JDSU at www.jdsu.com and follow us on JDSU Perspectives, Twitter, Facebook, and YouTube. **www.jdsu.com**

Located in Cable, Wisconsin, Norvado is the local, hometown telecommunications provider to over 8,000 subscribers in Bayfield, Douglas, Sawyer, and Ashland counties in Northwestern Wisconsin. In the summer of 2014, Norvado completed its Fiber-to-the-Home project, allowing for the delivery of gigabit broadband speeds to most subscribers. This made Norvado one of the limited number of companies in Wisconsin able to offer this type of speed to customers. Norvado's state-of-the-art fiber optic network allows for many beneficial offerings for all of Norvado's customers, including hosted PBX, home and business automation, as well as telephone and television offerings. Norvado prides itself on offering broadband services similar to those found in larger cities, allowing customers the freedom to live in the beautiful North Woods, but still be connected to the rest of the world at the touch of a button.
www.norvado.com

Power & Tel is a reliable source for the various products and technologies needed to provide revenue generating services to your customers. Supplying material for areas such as: optical networking; outside plant; CO/headend/data center infrastructure; wireless networks; customer premise; home networking; testing; and much more. Serving the communications industry for over a half a century, Power & Tel understands the importance and value of efficiency within an ever-changing marketplace. By utilizing the company's expertise in managing products and data flow within the supply chain, you can place even greater focus on meeting subscriber demand and your profit objectives. Power & Tel is a WBE certified company, and also is committed to providing the highest level of quality service which includes being ISO and TL certified.
www.ptsupply.com

Suttle specializes in strategic innovation of connectivity solutions for communications service providers. Suttle's solutions for Triple Play services meet network needs from the central office all the way into the premise. Product customization fulfills specific customer needs, by incorporating the best available technology, leveraging existing infrastructure, and laying a foundation for future growth. Suttle's newest brands are FutureLink™ and MediaMAX™. FutureLink™ provides high-quality, medium-agnostic connectivity for high-speed OSP and premises applications. The FutureLink™ Stackable Fiber Interface Terminal (SFIT) -- among other platforms that feature grow-as-you-go capability -- is part of Suttle's FTTx solution. MediaMAX™ is designed for gigabit services. MediaMAX™ optimizes installation cost and practice while maximizing coverage and high-bandwidth at the point of use for multiple deployment topologies. Suttle's vision to be the industry leader in innovative solutions is founded on *connectivity reimagined* -- our drive to create the right solutions through an innovative development process to future-proof our customers' network and take it where it demands. Products are designed to comply with the most stringent industry standards; quality management systems are ISO 9001 and TL9000 certified. **www.suttlesolutions.com**

Telefónica is one of the largest telecommunications companies in the world in terms of market capitalisation and number of customers. With its best in class mobile, fixed and broadband networks, and innovative portfolio of digital solutions, Telefónica is transforming itself into a 'Digital Telco', a company that will be even better placed to meet the needs of its customers and capture new revenue growth. The company has a significant presence in 21 countries and a customer base of more than 316 million accesses around the world. Telefónica has a strong presence in Spain, Europe and Latin America, where the company focuses an important part of its growth strategy. Telefónica is a 100% listed company, with more than 1.5 million direct shareholders. Its share capital currently comprises 4.551.024.586 ordinary shares traded on the Spanish Stock Market and on those in London, New York, Lima, and Buenos Aires. **www.telefonica.com**

Verizon, headquartered in New York, is a global leader in delivering broadband and other wireless and wireline communications services to consumer, business, government and wholesale customers. Verizon Wireless operates America's most reliable wireless network, with more than 108 million retail connections nationwide. Verizon also provides converged communications, information and entertainment services over America's most advanced fiber-optic network, and delivers integrated business solutions to customers worldwide. A Dow 30 company with more than $127 billion in 2014 revenues, Verizon employs a diverse workforce of 177,300.
www.verizon.com