

Q&A with Ribbon Communications

## Taking a Disruptive Approach to Optical, Virtualized Networks

Ribbon Communications plots strategy to serve the global 5G networking and broadband service provider markets.

**B**ROADBAND COMMUNITIES editor-in-chief Sean Buckley talked about optical networking trends with three Ribbon Communications executives: Bruce McClelland, CEO; Jonathan Homa, senior director, portfolio marketing; and David Stokes, head of IP solutions and portfolio marketing.

**BROADBAND COMMUNITIES:** *Can you share an update on Ribbon's IP optical portfolio?*

**BRUCE MCCLELLAND:** Ribbon provides real-time communications software and IP optical networking solutions for service providers, enterprises and critical infrastructure sectors. In 2020, Ribbon merged with ECI Telecom Group Ltd, a provider of end-to-end IP optical transport and software-defined networking (SDN) solutions. This strengthened Ribbon's position in the converged telecommunications and datacom market, helped it expand into the rapidly growing 5G networking and broadband markets, and enabled it to leverage its global reach with Tier-1 service providers across geographical markets. Ribbon is executing this strategy with more than 250 global IP optical customers and more than 100,000 IP optical network element deployments. In fact, in the last 12 months alone, Ribbon's IP optical business has had a series of material wins with significant operators, such as Rogers, Optus, Singtel, Telecom Italia and MegaFon (a leading mobile operator in



Bruce McClelland

Russia). Another group of Tier-1 providers is under evaluation and engagement with Ribbon, providing it with an estimated \$14 billion global market opportunity based on Dell'Oro Group research.

Ribbon's success in gaining continued market share in this sector is, in large part, due to its disruptive approach of enabling a service-driven network architecture with

better economics. Ribbon optimizes the network's IP and optical layers, provides a next-generation orchestration and automation control system, and tailors its solutions using its global services organization. This approach is what we call IP Wave. IP Wave combines several vital components of Ribbon's IP optical portfolio, including Neptune for open IP routing; Apollo for programmable optical networking; Muse for multilayer, multidomain control and orchestration; and global services.

**BBC:** *How can IP Wave help ease network transformations, lower the total cost of ownership, and increase agility with automation?*

**BM:** That's a great question. IP Wave's value proposition focuses on improving economics and increasing network and service agility. Ribbon does this by seamlessly integrating IP routing and optical networking and automating operations. A key element in this process is Ribbon's converged, multi-access edge that combines disparate networks on one platform.

Next, Ribbon turns to investment efficiency. IP Wave optimizes IP optical networks by providing fit-for-purpose solutions that scale to service and traffic needs across the network without over-engineering. In addition, Ribbon takes an open approach, ensuring no vendor lock-in, so it interoperates with and extends the use of other network solutions.

IP Wave focuses on streamlining and automating operational expenses and processes. Automation across the complete operations life cycle of design, plan, build, provision, assure and maintain helps providers launch new services and revenue streams quickly. In addition, Ribbon's continuous integration and delivery enable rapid development of customized applications, whether by Ribbon or the providers themselves.

**BBC:** *Can you share some use cases for the IP Wave?*

**BM:** Bharti Airtel [a leading telecom company in India] has implemented a semi-automated workflow with human oversight that dramatically reduced the provisioning time by more than 80 percent and virtually eliminated process and database errors. Canadian operator Rogers Communications implemented a future-proof optical backbone with first-to-market 400G ZR+ technology, enabling pay-as-you-grow 400G+ lanes. Colorado-based Viaero Wireless improved its economics via an integrated IP visual solution, all managed through a single pane of glass, including advanced monitoring and analytics.

**BBC:** *Can you identify trends, gaps or opportunities in the IP optical space?*

**BM:** There are quite a few converging trends in the telecom industry and IP optical space, forcing industrywide change. The first is 5G and fiber buildouts that drive incredible access and transport bandwidth increases.

We're also seeing demand from consumers for cloud gaming, telemedicine, remote work and other services that require deterministic network performance. It's likely this demand will only increase with more sophisticated requirements.

Another key trend is the cloud networking movement. This segment uses centralized data centers to distribute compute and storage functions across the network. Once again, this creates more-complex, high-bandwidth traffic patterns. When these bandwidth-focused trends are combined with increased competition from webscale providers, independent network operators and utelcos, it's no wonder service providers are looking for ways to increase capacity and performance, improve agility, and find new revenue streams to drive profit quickly. These trends allow operators to evolve their networks, specifically

the IP optical networks, to a service-driven approach. This solution will enable organizations to adapt rapidly and dynamically to new services created with the flexibility to support changing strategies, customers and demands without over-engineering networks.

**BBC:** *A Dell'Oro Group report revealed that the optical transport equipment market declined 2 percent for 2021 due to weaker market conditions across many countries in the Asia Pacific region, including China. However, the market expanded in North America, Europe, Latin America and other areas. What's your take on the past year in optical networking trends?*

**JONATHAN HOMA:** To a certain degree, all markets are cyclical. Without even looking into the specific factors that drove the market up or down, we can see in previous years that there's been a lot of growth in countries such as China and growth was weaker in North America. This year, North America is catching up. A host of factors contribute to these kinds of cyclic trends, from more fiber buildout – particularly in the rural markets – to a greater uptake of new wireless technologies.

Much like how the market is cyclic, trends driving capacity are also cyclic. Only a few factors drive a network's power,



Jonathan Homa

which, in turn, influence the optical transport equipment market. These include mobile rollout. With 5G, there are two different network deployments – non-standalone (NSA) and standalone (SA). NSA builds 5G networks over existing 4G equipment, and SA is independent of 4G networks. As NSA using existing infrastructure starts to run out of capacity, organizations are faced with either beefing up their current networks or transitioning to SA. This requires extra power.

The shift to significantly fiberized access networks, which is occurring worldwide, is another factor driving capacity. As countries increase fiber rollouts, this increases access bandwidth, increasing the power required from the optical transport market. Finally, the evolution of cloud services is driving the amount of capacity needed to support services, which improves visual ability. The 5G cycles are different in each country, the fiber rollout cycle is different in each country, and adopting the cloud is different in each country. Where each country is on those trajectories, where they already have invested, and where they have spare capacity in the network will impact the rate at which the optical network needs to evolve.

**BBC:** *Can you talk about what you're seeing in North America and other regions of growth?*

**JH:** Part of the growth of the optical transport equipment market is due to a growing number of operators who want to take advantage of innovations in optical technology. If you ask communications service providers what they look for from network upgrades, the answer will usually be more capacity at lower costs. New optical technology delivers this.

One example is Canadian operator Rogers Communications, which recently deployed 400G ZR+ technology to add increased capacity across its national footprint, maximizing its wireless network's efficiency and performance. Rogers is part of a growing number of service providers pursuing optical technologies such as 400G ZR+, including operators such as Colt Technology Services and Windstream.

In addition, the North American market recovery was much more significant than most analysts had predicted. Revenues in 2021 exceeded pre-pandemic revenues. However, the North American market did contract in 2020 because of the pandemic. Taking 2020 into consideration, increased spending is primarily the result of improved confidence in consumer spending and the need to add capacity to routes experiencing higher utilization than initially predicted.

**BBC:** *What's driving the growth that Dell'Oro mentions?*

**JH:** The onset of the pandemic meant the popularity of cloud-based collaboration platforms, such as Microsoft Teams and Zoom, grew tremendously. Microsoft Teams grew from 13 million users to 250 million users in just 19 months. This transformation reshaped traffic flows

and increased capacity demands for optimal application performance. As a result, enterprises needed to modernize their communications networks to support the new level of high bandwidth requirements.

In recent years, several government initiatives have emerged to fund the reach of broadband to rural areas and network upgrades to align with the demand for more bandwidth, which we suspect is also driving this growth. According to a 2021 report from Omdia, 5G investment, cloud service growth, and demand for “infotainment-at-home” are other drivers increasing demand in the optical networking market. In particular, there has been a broad uptake of video streaming, with 86 percent of households currently subscribing to one or more services.

**BBC:** *What is the adoption rate of 400 Gbps wavelengths?*

**JH:** Dell'Oro Group's Optical Quarterly Transport Report for the fourth quarter of 2021 reported 17 percent year-over-year growth in 400G and predicted accelerated growth of 52 percent in 2022 as a result of the mainstream adoption of 400G globally (outside of China).

**BBC:** *How is Ribbon helping support the growth of wavelength services?*

**JH:** Instead of providing Gigabit Ethernet (GbE) connectivity, service providers will give enterprises entire wavelengths that they can fill up as they wish. By providing whole wavelengths with very high capacities, providers help fill the need for more and more bandwidth. Ribbon offers solutions that support these wavelength services, which leverage optical transport solutions connected to enterprises so they have dedicated wavelengths to transport traffic.

**BBC:** *Looking beyond 400G, When will 800 Gbps shipments become material?*

**JH:** So far, 800G technology has been adopted across more than 35 countries by nearly 150 unique operators. And there's evidence that the market might jump from 400 GbE to 800 GbE, bypassing 400 GbE from a data-center cycle. This would drive an extreme need for 800G shipments in the future, starting in about 2024 or 2025.

One significant rationale for evolving from 400G to 800G is the traffic that needs to be transported. In the past, the direct traffic being transported was 100 GbE. Those who needed to transport many hundred GbE interfaces off routers put them together into a higher transport channel. Depending on multiple factors, these went in increments of 100G (e.g., 200G, 300G, 400G, etc.). In today's post-pandemic world, bandwidth-hungry applications, such as video, are used everywhere, and 5G mobile, VR and AR traffic is on the horizon. These bandwidths will quickly become inadequate. Compared with 400G, 800G means twice the bandwidth and doubles the maximum amount of data transmitted in a given amount of time.

Ribbon will start supplying the second generation of 800G performance-optimized solutions that maximize

channel capacity and reach any fiber condition by this year. Ribbon is also going to transfer this 800G transport to power-cost optimized solutions in early 2024, which will support 800G more economically than the proprietary technologies solutions are based on today.

**BBC:** *5G is a service that will require a lot of fiber to deliver. How do you see the 5G opportunity playing out for Ribbon?*

**DAVID STOKES:** Ribbon has an exceptional portfolio to take more than its fair share of the market as 5G grows. We are focused on creating a flexible transport environment that allows us to work very well in 5G across the IP and optical layers of networks.

5G will probably require more capacity, but it will provide power to more places. Because of this, wholesaling 5G to the network will be an immense opportunity, but there will also be a lot of private networks looking to use 5G using open radio access network (O-RAN) technology. Ribbon is well placed as a RAN-neutral vendor, which allows us to play into an O-RAN environment in wholesale and private network environments.

In the last few months, we've seen lots of wins in various areas because Ribbon has a transport network well suited to meet the needs of 5G and the capabilities to support IP and optical networks seamlessly.



David Stokes

One such win is Viera Wireless and Viera Fiber Networks. They use Ribbon's comprehensive suite of integrated IP and dense wavelength division multiplexing (DWDM) solutions to increase their network capacity and expand offerings and services dramatically.

**BBC:** *How ample is the cloud networking opportunity?*

**DS:** There are two things to consider when talking about cloud networking. One is networking between the large, cloud-scale providers: Google, Facebook, Amazon and Microsoft. This is a market that's continuing to grow. The other is enterprises themselves. In this instance, an increasing number of enterprises are working with the cloud – almost 70 percent of companies have advanced their cloud migration over the past year.

Most enterprises no longer support their own in-house IT operations. Instead, they outsource their IT operations to be housed in data centers. This is usually a hybrid model between private data centers and public data centers from cloud-scale providers. Enterprises need increased connectivity from their corporate sites to the data centers. They fulfill this through private optical networks or by leasing managed bandwidth services from service providers.

Ribbon sells private optical network solutions and visual transport offerings, which service providers use to extend connectivity to the cloud to enterprises. This is an area where we have had increased wins. For example, Telehouse, a leading European co-location data center provider, leveraged Ribbon's optical transport technology to deliver secure connectivity between its data centers and the enterprises it serves. Looking at the networking opportunity, this is a critical area, along with 5G and fiber buildouts, driving increased traffic that Ribbon's solutions are positioned to handle with unparalleled scale, performance and agility.

**BBC:** *There's a lot of activity from several sections of the utility telcos sector – including traditional large utilities, municipal utilities and electric cooperatives – building out fiber-to-the-home networks. How can Ribbon help support these builds?*

**DS:** The major shift to remote work in the past two years has highlighted the necessity of internet access and the lack of access to high-speed broadband internet service in some parts of the U.S. – mainly rural areas. A recent FCC broadband report found that 19 million people in the U.S. still lack access to broadband internet, including approximately 14.5 million people living in rural areas.

Electric cooperatives are increasingly taking on the nontraditional role of delivering high-speed internet access and other advanced communications services to local customers and residents. They are filling a void in places where some more traditional communications service providers have deemed it too expensive to extend broadband service.

Ribbon has a longstanding and rich history with its electric and utility provider (utelco) customers. For decades, Ribbon has serviced and supported its customers' voice networks and it can now provide them with best-in-class solutions so they can build out IP and optical data networks that will bring high-speed broadband services to Americans, regardless of where they live.

Over the past year alone, Ribbon has worked with providers including Pineland Telephone Cooperative, Tombigbee Electric Cooperative, Eastern Slope Rural Telephone, and Dakota Central to upgrade their IP and optical networks, allowing them to deliver more services with increased network capacity and faster broadband speeds.

Ribbon's market-leading technology enables customers such as Georgia Transmission and Tombigbee to quickly scale their networks to

provide advanced communications services. Importantly, Ribbon helps its cooperative electric customers significantly reduce operational and maintenance costs by actively monitoring their fiber networks. Using Ribbon's Fiber Health Management, operators can pinpoint fiber faults to facilitate quick repairs, improve access to remote substations and data centers for disaster recovery, and guarantee the transmission of critical operational data.

**BBC:** *At the same time, utilities leverage that same fiber to serve internal operations such as SCADA and automation of the grid. Do you see that trend playing out?*

**DS:** I would flip that statement. Utilities are laying the fiber to support their modernization and digitization needs, and then they are using that fiber to act as telcos. There are many reasons utilities need to digitize. Depending on which type of utility they provide (e.g., oil, gas, water), utilities are putting a vast number of sensors in their networks to monitor the flow of what they're delivering and look for leakage or any other potential issues. As new applications such as smart metering and smart grids start to be used, utilities must put a lot more capacity in their networks to support the unique demands of next-generation applications while still keeping their legacy services, such as SCADA and teleprotection. The only natural way is to put fiber in

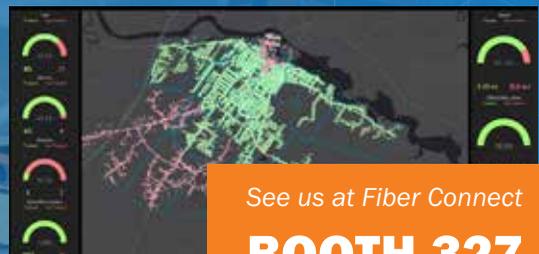
the network. The capacity of fiber provides more than they need, so they have a lot of spare capacity in the ground that they can repurpose to generate revenue from other services.

Ribbon understands utilities' operational and technological drivers. Ribbon has hundreds of critical infrastructure customers worldwide, many of whom are evolving into utelcos, and is a proven, trusted partner for network transformation. Our experience allows us to quickly advise utilities on how they can best utilize their networks to maximize revenues without increasing complexity. Ribbon is in the process of rolling out a brand-new automation system for its IP and optical products. With advanced tools providing automation across the entire life cycle, including for planning, provisioning, alarm management, fiber health management and performance monitoring, utilities will be able to grow their revenues without increasing their staff or their staff expertise. ❖

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