ribbon

Accelerating Network Transformation

Bridging the Digital Divide with Ribbon's IP Wave

Great Broadband Needs a Great Aggregation and Transport Network

Converged IP Optical Aggregation and Transport is needed if the benefits brought by high-capacity fibre access are to be fully realized. By using the funding available for fiber access networks and Ribbons IP Wave for IP Optical transport, operators can build an automated, converged, high performance, high capacity network which profitably bridges the digital divide.

Broadband is a New Fundamental Utility

Around the world, governments are coming to the realization that access to affordable, full-fiber broadband is no longer a nice to have, it has become a new fundamental utility. For some time now broadband has allowed offline services to become increasingly online, like seamless streaming of TV shows and movies and applications moving from the desktop to the cloud. However, we are now seeing physical, real world activities also moving to the online world, like internet banking, working from home, distance learning, remote GP consultations and of course meetings with families and friends. Over recent years we have all come to realize how important reliable high-speed broadband is for our lives.

Governments are aware of the benefits reliable ultra-broadband brings, and of the societal issues of creating a larger digital divide between ultra-broadband haves and have nots. So they are investing billions to replace the copper telecoms infrastructure, with a fibre infrastructure allowing full-fiber broadband to be offered to all their citizens. The aim is to bring affordable broadband to everyone, helping to bridge the digital divide.

Applications Driving High-Speed Residential Broadband Demand

- Work-from-home & SaaS (Teams, Zoom, Slack, etc.)
- Video streaming (Netflix, Hulu, Amazon Prime, etc.)
- Cloud gaming (GeForce, Shadow, Vortex, etc.)
- Distance Learning
- Financial services
- Online retail

Making Broadband for All a Reality

High-bandwidth access networks are just a starting point on the road to high-speed broadband. A new aggregation and transport network is needed to complete the journey and make broadband for all a reality. Next-generation backbone networks must:

- Scale to 100G capacity and beyond to support high-speed access services of up to 1 Gbps
- Meet extended distance requirements (100+ km) to reach far-off subscribers and distant PoPs
- Ensure superior user experiences for new, diverse, applications with distinct QoS requirements
- Make optimal use of network capacity to maximize investment returns
- Be easy to provision, build and operate, and require no special training or expertise
- Provide the flexibility and programmability to evolve to support transport services such as 5G

Next-generation aggregation and transport networks pose a variety of design, traffic engineering, and operational challenges for network planners and architects. Tomorrow's broadband networks will support a variety of applications with distinct characteristics and service level requirements. Some applications will be latency-sensitive, others will have strict availability requirements. Traditional best-effort connectivity services aren't well suited for the new services in the digital age.

To monetize the next wave of services, providers must deliver the right SLAs, for the right applications, at the right time. By satisfying stringent scalability, service quality, performance, availability and security demands, and by streamlining operations, next-generation aggregation and transport networks will help service providers increase revenues, boost margins, and accelerate return on investment.

Tap into the Massive 5G Market with Backhaul Transport Services

5G backhaul transport services are a huge potential revenue source for operators with fiber access networks. Mobile Network Operators need fast, secure, and reliable connectivity to their 5G base stations.

Owners of fiber networks can take advantage of 5G network slicing functionality to cost-effectively support multiple MNOs and service types over common backhaul transport infrastructure. With network slicing, a 5G network is partitioned into distinct logical networks with discrete service level assurances (i.e., unique data speed, latency, and reliability commitments) to support differentiated services and multitenancy. For example, an MNO might create an ultra-low-latency, high reliability slice to support delay-sensitive, safety-critical autonomous vehicle data, and a best-effort slice to support lower-priority, non-critical IoT traffic.

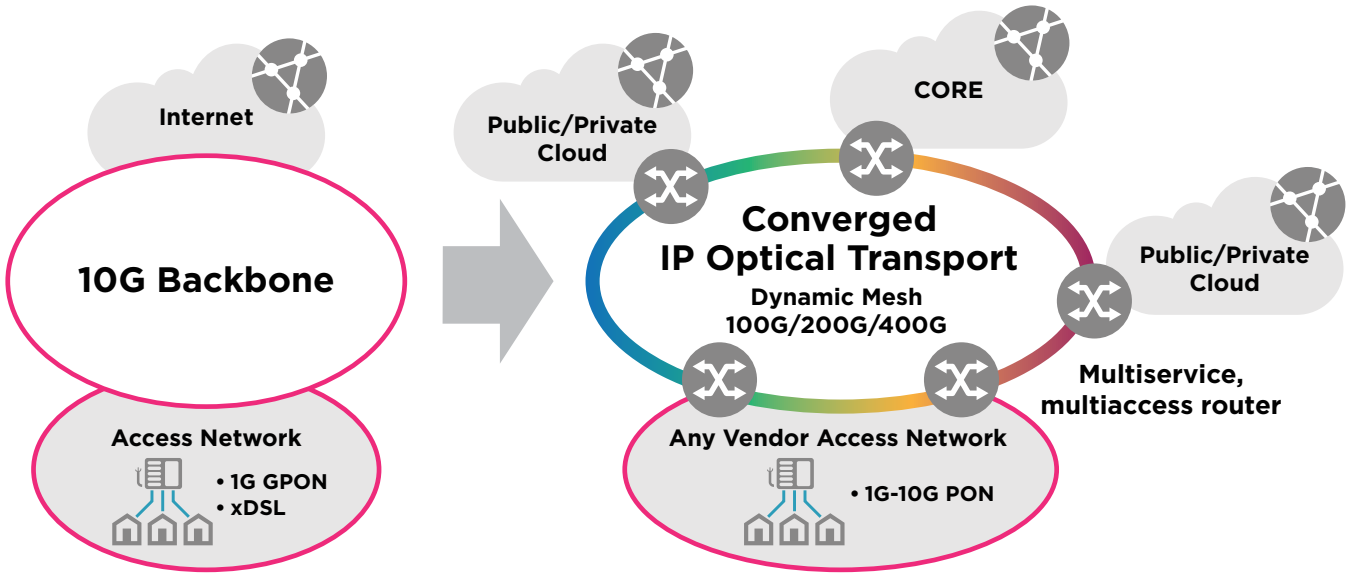
With network slicing, owners of fibre networks have the multitenancy and the service delivery performance guarantees they require to profitably wholesale backhaul transport to MNOs.

Great Broadband Needs a Great Aggregation and Transport Network

Tomorrow's broadband networks must meet the increased capacity, performance, security, availability, and price requirements of the digital era. In addition, workloads (services and applications) are migrating to public and/or private clouds, and these clouds are moving from the core of the network, closer to the user. The aggregation and transport network must meet the performance characteristics defined for the delivery of data to each workload, dynamically providing connectivity and capacity whenever and wherever it is required.

To optimize service performance while minimizing costs, the IP Optical Transport network must support both IPoDWDM and multi-layer IP Optical transport either independently, or simultaneously in the same network, with the flexibility to evolve between the two approaches as business, service and operational needs evolve. Automated domain orchestration becomes key in providing full lifecycle management across these different network architectures.

So we end up, with a "dynamic virtual mesh" . A converged IP Optical network provides mesh connectivity, with traffic routed across this mesh at the most appropriate layer (IP or Optical) based on the workload needs, the location of the workloads and the traffic capacity required, which can be dynamically and autonomously be scaled–up or down.



Traffic Engineered IP-Transport Guarantees SLAs for Diverse Applications

Next-generation broadband networks will support a wide variety of applications with distinct characteristics and SLA requirements. Some applications like streaming UHD video are bandwidth-intensive, but can tolerate latency. Other applications like cloud gaming and web meeting services are both bandwidth-hungry and delay-sensitive. Service providers must find scalable ways to enforce different SLAs for different types of applications, without overprovisioning bandwidth and squandering expensive network capacity.

Traffic engineered IP-Transport provides deterministic connectivity, allowing network operators to provide distinct QoS assurances for different types of applications. OAM functionality is required to simplify management, and improve visibility and troubleshooting and point-and-click provisioning is required to streamline administration and accelerate service velocity.

Traffic engineered IP-Transport enables service providers to deliver tiered services (e.g., a dedicated cloud gaming package) to increase differentiation, create upsell opportunities, and boost revenues. Providers can also leverage Traffic engineered IP-Transport to enable network slicing for 5G backhaul.

Bridging the Digital Divide with Ribbon's IP Wave

Ribbon's IP Wave is a converged IP Optical Network which able to dynamically allocate the connectivity, the capacity and performance wherever it is required in the network. This allows service providers to profitably support services which demand a vast array of different performance requirements.

Ribbon's IP Wave comprises of:

- **IP Routing and Packet Transport** – Ribbon's NPT portfolio provides the multiservice multiaccess capabilities required to aggregate all service types to be transported across the network. A full set of IP routing protocols, such as IP/MPLS, MPLS-TP, FlexE, FlexAlgo and Segment Routing ensure the services are transported to meet their service delivery SLAs needs on a service-by-service basis. With support for high-performance optical pluggables, NPT can be used in IPoDWDM and/or integrated multilayer IP Optical architectures.
- **Optical Transport solutions** - Ribbon's Apollo portfolio is a modular high-performance cost optimized optical transport system. It delivers 100G/200G/400G everywhere with unconstrained wavelength routing over CDC-F ROADM nodes.All Apollo systems are fully controllable through open and programmable interfaces and deliver future-proof optical networking solutions customizable to business and operational needs.
- **Network Automation and Orchestration** – Ribbon's Muse SDN Orchestrator delivers multilayer IP Optical operations lifecycle management, helping eliminate manually intensive, error-prone administrative tasks with practical automation. With Muse operators can speed up service delivery, streamline operations, assure SLAs, achieve right first-time fault identification and localization and easily integrate into multi-vendor ecosystems.
- **Fiber Health Management** – Ribbon's Fiber Health Management lets central administrators efficiently monitor the health, status, and performance of geographically dispersed fiber networks. The solution helps service providers accelerate problem isolation and resolution, and increase customer satisfaction, while reducing costly and time consuming truck rolls. Ribbon uses vendor-agnostic, distributed OTDR (Optical Time Domain Reflectometry) technology integrated into the Apollo optical backbone to quickly pinpoint fiber breaks and degradations within a few meters, helping dispatch crews save time, avoid guesswork, and improve productivity.

Ultra-Broadband Opportunities Abound for Alternative Carriers

Innovative Operators such as altnets, rural broadband providers, MSOs, Utelcos, City Carriers and municipalities are launching new telecommunications businesses to generate new revenue streams and improve shareholder value. Many are pursuing the government funding to build fiber access networks. Using a converged IP Optical aggregation and transport network allows these alternative carriers to fully monetize their fiber investment by allowing them to easily to offer a whole range of residential, business and mobile transport services over the fiber infrastructure they have deployed.

Now is the Time to Upgrade Your Backbone

If the benefits brought by high-capacity fibre access are to be realized, you need to consider aggregation and transport network. With Ribbon's IP Wave you can build an automated, converged, high performance, high capacity IP Optical transport network which helps you bridge the digital divide today and gives you the agility to rapidly evolve and innovate as business and operational needs evolve.

With IP Wave you can meet the service delivery needs of a nest generation of high-value broadband services such as mobile gaming, while laying the foundation to be able to wholesale lucrative 5G backhaul service.

Ribbon's IP Wave is ideal for building high-capacity next-generation aggregation and transport networks to power tomorrow's high-speed, high-performance services. The product family helps bridge the gap between the high-bandwidth access pipes and the performance-dependent services these pipes need to transport. The portfolio helps you extend service reach, scalability and performance, supporting a wide range of applications and services, and with a programmable network and practical automation it reduces operations expense and complexity.

To learn how Ribbon can help your company build a great broadband backbone contact Ribbon today.

Contact Us Contact us to learn more about Ribbon solutions.

About Ribbon

Ribbon Communications (Nasdaq: RBBN) delivers communications software, IP and optical networking solutions to service providers, enterprises and critical infrastructure sectors globally. We engage deeply with our customers, helping them modernize their networks for improved competitive positioning and business outcomes in today's smart, always-on and data-hungry world. Our innovative, end-to-end solutions portfolio delivers unparalleled scale, performance, and agility, including core to edge software-centric solutions, cloud-native offers, leading-edge security and analytics tools, along with IP and optical networking solutions for 5G. We maintain a keen focus on our commitments to Environmental, Social and Governance (ESG) matters, offering an annual Sustainability Report to our stakeholders. To learn more about Ribbon visit rbbn.com.