

Ribbon's Elastic Metro Solution

Powering the Next Generation of Metro Networks



Elastically Scaling Carrier Ethernet

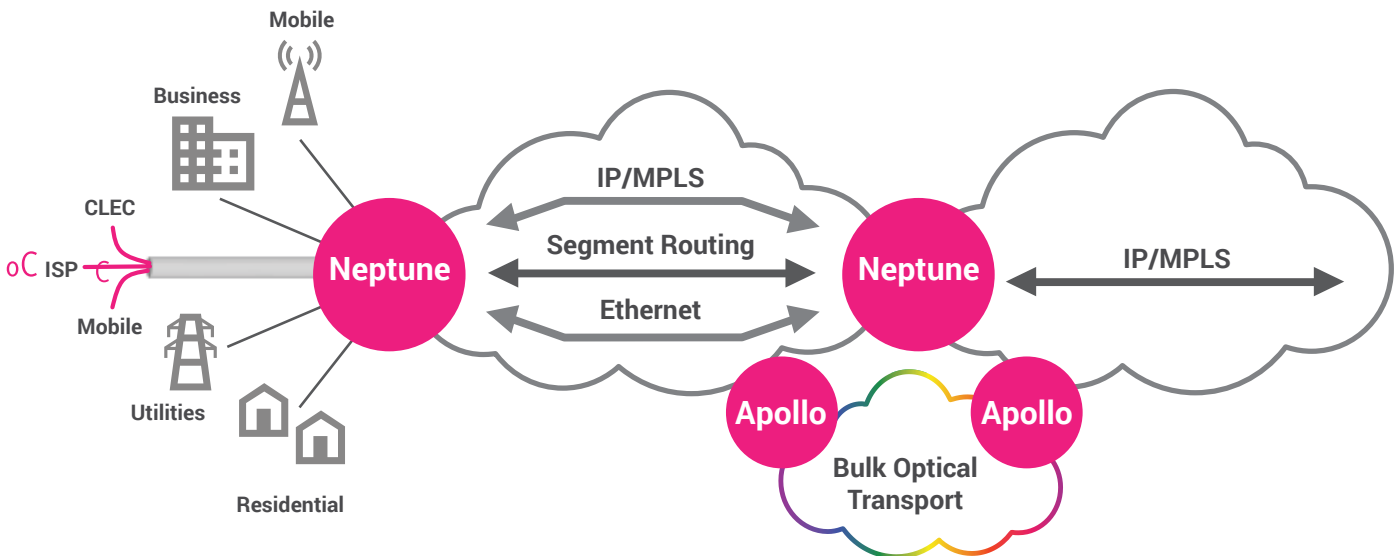
Telecoms services are undergoing rapid change, due to the ubiquity of IP transported by Carrier Ethernet and the increasing flexibility of the transmission network. Consumers are demanding customized, high capacity, always-up services enriched with video content. Instead of hosting these services locally, however, many customers want to see these services hosted in the cloud. Driven by over-the-top consumer models, customers now want to manage their services in real-time and only pay for what they use. Ribbon's metro solution is optimized to give Service Providers a high-capacity multiservice platform, which supports both current and future service needs efficiently.

On-Demand Scaling
with optimized 100G

Elastic MPLS
supports CE2.0 services

Always-On Services
with advanced software

Increased Margins
via high-value services

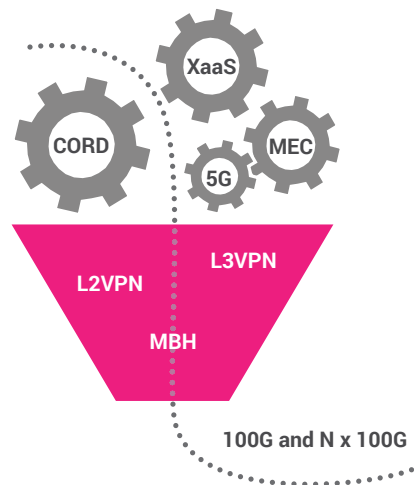


Cost-Efficient Scaling to Meet Traffic Demands

The metro network is evolving rapidly. Cloudification and video have already driven up capacity, which is destined to increase even further for support of IoT, big data, 4K video, and augmented reality.

Ribbon's elastic metro solution is fully equipped to accommodate this growth:

- **100GE for the metro network** – Provides a smooth evolution path to 100GE.
- **Optimized network architecture** – Packet aggregation is applied as traffic enters the metro network, leaving expensive switching and routing to be performed only where required.
- **Pay-as-you-grow** – A full metro portfolio makes it easy to deploy the right node at the right point in the network. Pay-as-you-grow is achieved with unique in-service expansion capabilities. You can expand the switch matrix by adding additional matrix cards and enhance deployed nodes by adding expansion units.
- **Support for new business models** – SDN and NFVi capabilities give the functionality required to support the new business models and services introduced by 5G, Multi-access Edge Computing (MEC) and Anything as a Service (XaaS).



Elastic Solution for a Flexible Multiservice Metro Network

Ribbon's unique Elastic MPLS technology is the power behind the flexibility and agility offered by the elastic metro solution.

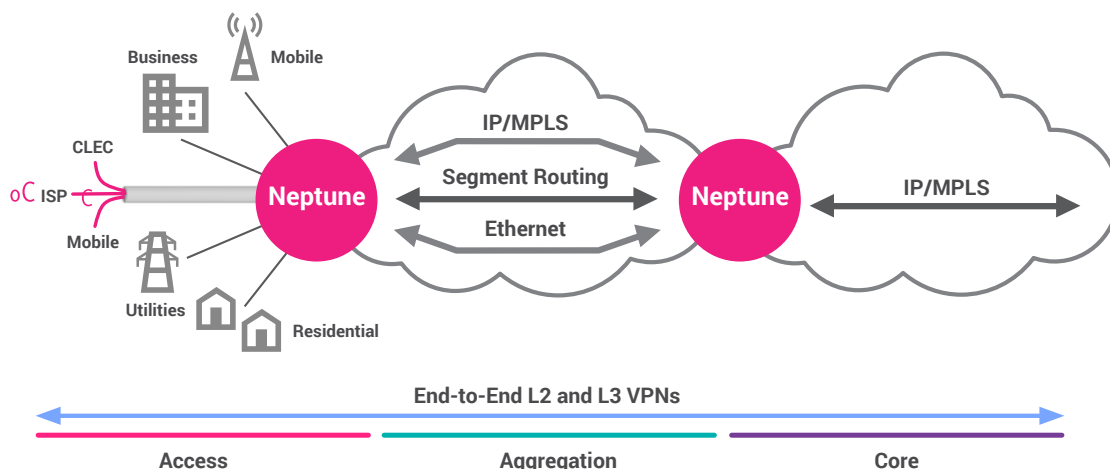
Elastic MPLS supports all of the technologies that a Service Provider needs in the metro network, including:

- Full range of certified MEF CE2.0 services
- IP/MPLS for L2 and L3 VPNs
- Static MPLS to allow easy migration of legacy customers
- Dynamic service scheduling, provided in conjunction with ECI's Muse software
- Segment Routing in conjunction with ECI's Path Computation Element
- NFVi for future multi-access edge computing.

The agility of the elastic metro solution also allows rationalization of the metro network with a field-proven transition path for legacy services to be migrated onto the new platform, and for the older end-of-life metro platforms, about to be retired.

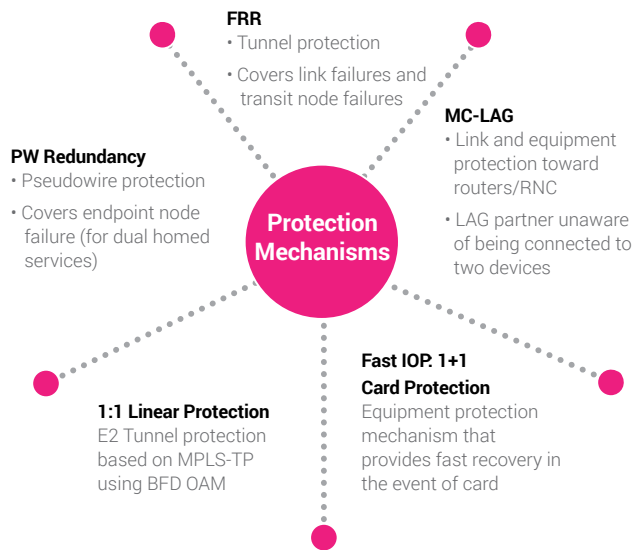
The elastic metro solution can be further extended to provide L1 optical services and bulk optical transport with advanced operations software, providing full multilayer integration across the packet and optical layers. Intuitive network management, complemented by the Ribbon service portal, allows the service provider to offer services, such as:

- A wholesaler (for example - providing a MBH service to Mobile operators)
- A retailer to enterprise customers (for example - providing a fully managed service to a bank)



Offering Services That Are Always-On, Anywhere, Every Time

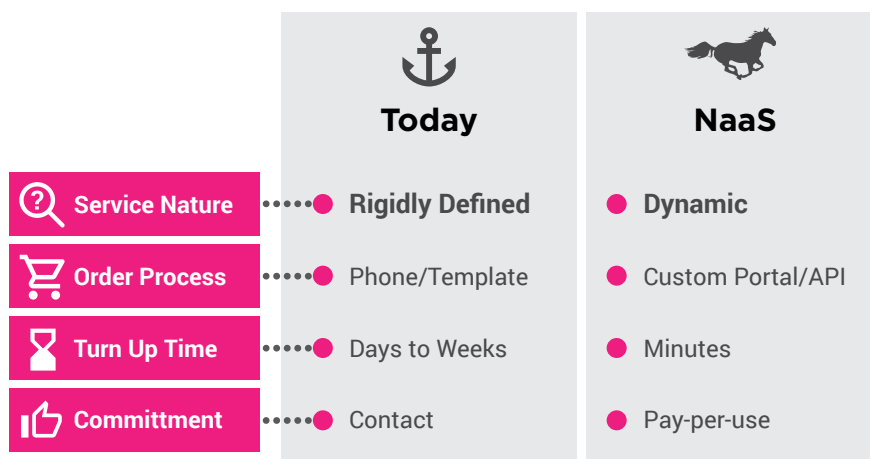
Ribbon's solution allows the operator to offer services with more than five 9's availability. This is enabled by the combination of:



- **Fully redundant equipment** – With 1+1 and 1:1 protection of key units
- **Extensive set of protection and resiliency** – Rapid protection switching for single and multiple failures across all technologies
- **Remote disaster recovery** – Restoration from geographically dispersed sites in the event of catastrophic failure
- **Rapid fault identification** – Advanced operations software to rapidly identify network outages and service degradation
- **Analysis of network performance** – Monitored over time to identify trends, allowing service degradation and faults to be anticipated and corrected before they occur
- **Service Level Agreements (SLAs)** – Analysis of service behavior to ensure SLAs are being met.

Increase Margins with High Value Services

The Service Provider marketplace is extremely competitive, with customers able to select a variety of Service Providers and Over the Top (OTT) players for their services. Ribbon is able to help Service Provider “stickiness” in this competitive environment, by using Elastic MPLS. This provides the flexibility and agility to rapidly introduce new services and business models thereby allowing them to maintain a state-of-the-industry service portfolio.



Evolution to High-Capacity Multiservice Metro

Your Challenges	Our Solutions
Soaring Traffic	<p>Ribbon provides a seamless evolution path to 100GE and higher-capacity metro networks:</p> <ul style="list-style-type: none">• The solution maximizes cost efficiency by putting cost-optimized technology at the right points in the network.• The Ribbon solution is fully SDN-enabled allowing the operators to take advantage of the network flexibility offered by SDN when they are ready.• Embedded NFVi allows extra compute and virtualized services to be added, when and where required.• Integrated optical layer provides additional, cost-effective capacity and L1 services.
Rapid expansion of number of services and service flexibility	<p>Ribbon provides a true multiservice platform:</p> <ul style="list-style-type: none">• Elastic MPLS – provides the functionality to support fully-certified CE2.0 services, L2 VPNs and L3 VPNs. It offers the flexibility to migrate existing customers, and to continue to support services and business models as they evolve.• Multilayer integration – provides integrated service management across all layers.• Optimized functionality – for those services that have specialized transport needs, such as backhaul, video, and synchronization.• Future-proof architecture – an embedded NFVI architecture provides the compute platform for multi-access edge computing (MEC) to enable virtualized services.

High-Value, Always-on Services

Your Challenges	Our Solutions
Need to offer customers services that are always on, anywhere, every time	<p>The Ribbon metro solution provides always-up services:</p> <ul style="list-style-type: none">• Highly-resilient hardware – ensuring key elements of the network do not fail.• Extensive protection schemes – cost efficiently protects all layers of the network against single and multiple failures in the network.• Advanced operations software – provides data about service and network degradation and failure, allowing rapid root-cause-analysis and rectification.• SLA guarantee monitoring – allows the Service Provider to monitor the services running on the network and react before customer SLAs are broken.
Pressure on margins from competitors	<p>The Ribbon solution provides a platform to increase Service Provider profitability:</p> <ul style="list-style-type: none">• Increased stickiness – by giving Service Providers the flexibility to offer their customers new high-value premium services.• Maintaining a state-of-the-industry service portfolio – with advanced SDN and NFV capabilities, the Ribbon metro solution allows Service Providers to rapidly add new services to its portfolio.• Driving down TCO – by using Ribbon's cost-optimized hardware, in conjunction with the network agility provided by SDN and NFV.

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.

Contact Us Contact us to learn more about Ribbon solutions.