

Elastic Wireless

Flexible Wireless Transport

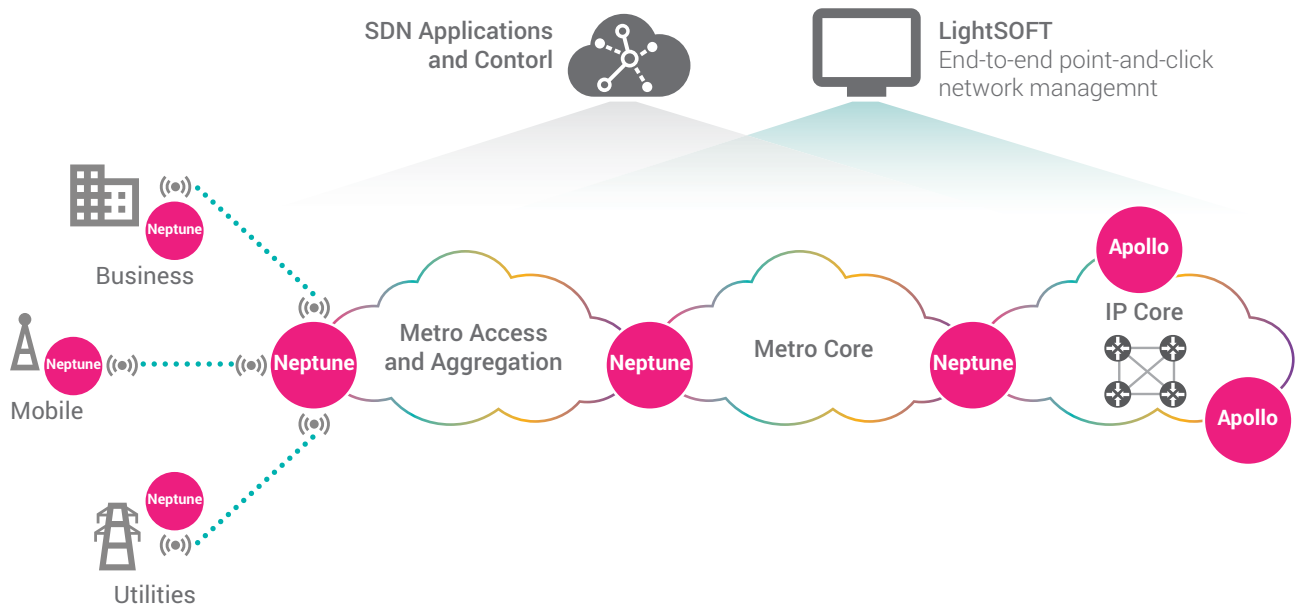


Extending Fiber Performance Over the Air

Elastic Wireless is an ecosystem of wireless transport solutions for any network topology and any wireless environment. This ecosystem provides an integrated solution to transport high bitrates over both wireless and fiber infrastructure in the access and aggregation network segments. Elastic Wireless is based on combining Ribbon's Neptune (NPT) L1 to L3 packet optical transport with leading microwave and Wi-Fi outdoor solutions.

Combined with multivendor management and control, Elastic Wireless offers the most comprehensive solution for small-cell backhaul, wireless access, and backup services.

Any frequency from sub 6GHz to E-band	Any wireless topology PtP, PtMP	Any network topology mesh, ring, chain	Unified Management for multivendor radio
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Wireless and Fiber

Integration of the Neptune packet-optical fiber-based portfolio with leading wireless vendors and technologies generates a best-of-breed fit for any network. The flexible choice between fiber and wireless that can operate independently (or in conjunction), tailors the best solution, whether temporary or permanent, to any network scenario. It is perfect for:

- Locations that cannot be served by fiber because of cost or terrestrial conditions (such as dense urban or mountainous areas)
- Locations where fiber reach is planned and the preferable solution will preserve most of the investment despite technology changes
- Locations already served by fiber that need a backup solution.



Point-to-Point Microwave

Elastic Wireless integrates the industry's most advanced microwave technologies to support emerging high-capacity requirements for 4G and 5G backhaul, midhaul, and fronthaul, Wireless Internet Service Provider (WISP) networks, and private networks (enterprise, government, utilities). Elastic Wireless offers the best spectral efficiency for high-packet capacity with the most advanced spectrum utilization features. These include ACM (Adaptive Code Modulation), XPIC (Cross-polarization interference cancellation), header compression, and service-aware diverse routing. A wide range of all-outdoor zero-footprint radios are supported through PoE+ (Power over Ethernet), including:

- Unlicensed MW band, optimized for low-medium capacity. This is the most cost-effective solution for low-density mobile network tail, medium/small size, private and public network, and enterprise connectivity.
- Licensed MW Band, which is the future-proven Wireless Transport support to "Broadband Everywhere", thanks to smart antenna technologies, modulation, and radio optimization.

Point-to-Point Millimeter Waves (E/V-Band)

Utilizing 60 GHz to 80 GHz congestion-free spectrum, Elastic Wireless is able to deliver up to 20Gbps capacity. The pencil-beam high-gain antenna guarantees high performance and maximizes spectrum reuse. This is an ideal solution for dense, capacity-hungry mobile backhaul, especially in highly-populated urban areas where backhaul from many small cells is required. The all-outdoor radio has a tiny footprint, simplifying site acquisition. Its light weight and small size result in quick and straightforward installation. The user-friendly web GUI manages local and remote units and can copy configuration changes to the remote unit automatically.

Asymmetric Capacity Optimization allows asymmetric capacity configuration setup, matching your upload/download rates to specific application and optimized spectrum use. Carrier-grade performance over wireless is provided through QoS-aware hitless adaptive bandwidth coding and modulation for high availability. Combining high throughput and low latency, Elastic Wireless delivers affordable, point-to-point wireless connectivity with fiber-like performance to future-proof carrier networks.

Point-to-Multi-Point WI-FI

With beam-forming technique and mesh architecture support, Elastic Wireless offers robust operation in the toughest environments. These include congested spectrums, non-line-of-sight conditions and harsh weather. Wi-Fi can be used for connecting the end user to the base station and for last mile backhaul. Elastic Wireless supports both symmetric and asymmetric traffic and operates in both licensed and license-free sub-6GHz frequency bands.

The Elastic Wireless series of Wi-Fi products includes:

- Micro-sector base stations - ideal for top-down Wi-Fi coverage
- Pico base stations - ideal for cost-effective street-level coverage
- Femtocell - ideal for ad hoc networks and on-demand capacity needs

This series forms an innovative foundation for delivering high-performance, self-assembling, self-healing architectures for Wi-Fi networking and service delivery. The systems are equipped with separate radios for mesh networking to enable simple, dependable, and high-performance inter-networking. Its extensive feature set enables small-cell backhaul as well as high-speed enterprise access with assured SLAs.



Networking and Optical Transport

Ribbon's Neptune (NPT) product line streamlines end-to-end metro service delivery by combining Carrier-grade service assurance, visibility, and control with packet efficiency and unparalleled L1 to L3 multiservice support. Neptune offers a powerful, flexible, and efficient E2E metro solution for high-performance L1 to L3 services through convergence of IP, Elastic MPLS (IP and TP), Ethernet (MEF CE2.0 certified), OTN, WDM, and TDM. NPT also supports NFV services and SDN applications, which are compulsory in today's challenging metro environment.

End-to-end: Large variety of networking platforms combined with all-outdoor radios, supporting a wide range of configurations and matching diverse networking scenarios - from tail sites supporting a single radio link, to chain or ring sites, to hub sites supporting multiple radio heads.

Elasticity: Neptune's flexible architecture ensures seamless cross-network-domain interworking and risk-free network transition to a converged packet-optical infrastructure. Elastic MPLS guarantees seamless interworking between different MPLS domains, facilitates service operation, and enables new revenue-generating VPN services. NFV support enables fast, easy, and cost-efficient introduction of new services per site.

Packet: Neptune is certified for all MEF CE 2.0 services and supports both L3 and L2 VPN services, with interfaces ranging from 10M to 100GE.

TDM: Legacy TDM services are supported through Circuit Emulation (CES) or over OTN, with interfaces ranging from PCM to SDH/SONET.

OTN: Transparent services over OTN, range from TDM to Ethernet, video, and storage.



LightSOFT® Unified Management

Like all Ribbon transport products, the Neptune family is managed by the GUI-based unified multilayer LightSOFT NMS.

Unified Alarm View – Both wireless and packet-optical alarms are displayed together. This reduces the overhead of multiple systems, shortening the response time for troubleshooting, with all the benefits of LightSOFT alarm management, including alarm forwarding and history view for all parts of the network. Performance monitoring information from all network elements is collected and displayed.



LightSOFT
End-to-end point-and-click
network management

Sub 6Ghz

Sub 6-23Ghz

Sub 24Ghz

Sub 24-42Ghz

60Ghz V-Band

70-80Ghz E-Band

	NPT-1010	NPT-1020/1021	NPT-1050	NPT-1200
Switching capacity	5 Gbps	10/60 Gbps	100/200 Gbps	100/320 Gbps
# Radio heads	4	4	6	12

Technical Specifications

Wireless	Frequencies: Sub-6Ghz band (802.11 a/b/g/n), Licensed 6-42 Ghz, V-Band 60 Ghz, E-Band 70-80 Ghz Topologies: PtP, PtMP
Packet	Services: MEF CE2.0 (E-Line, E-LAN, E-Tree, E-Access), Ethernet, L2 VPN, L3 VPN, MPLS-TP, IP/MPLS Interfaces: FE, 1GE, 10GE, 100GE
TDM	Services: CES (SAToP, CESoP and CEP) Interfaces: n x 64Kbps (FXO, FXS, 2/4W E&M, V24, V35, V36, V11, RS422, RS449, C37.94, OMNI, G.703 64K), E1/T1, STM-1/OC-3, STM-4/OC-12
OTN	Services: Ethernet, Storage, Video, SDH/SONET Service interfaces: 10GE, FC-1/2/4/8/10, SDI, HD-SDI, DVB-ASI, STM-16/64, OC-12/48 Transport interfaces: OTU-1, OTU-2, OUT-2e
WDM	CWDM, DWDM, muxponder, amplifiers
Timing and Synchronization	SyncE, 1588v2, External 1PPS and TOD timing, Internal stratum-3 clock (holdover state), Primary and secondary sources (supports SSM bits), ACR, DCR, loop timing on SAToP
Protection and Restoration	HW redundancy for common units, IO Hardware protection (IOP), G.8032 Ethernet Ring Protection (ERP), MPLS-TP, FRR, Dual FRR, 1:1 Linear protection, PW Redundancy, Virtual Router Redundancy Protocol (VRRP), MS-PW, IEEE 802.3ad Ethernet Link Aggregation (LAG)
OAM	Ethernet OAM (IEEE 802.1ag and ITU-T Y.1731 PM), IP/MPLS OAM (LSP Ping, LSP Trace-route), MPLS-TP OAM (CC/AIS/RDI/LB/LT/DM), Bidirectional Forwarding Detection (BFD), RFC 2544 generator, Y.1564
Traffic Management	Traffic Classification (based on Port, VLAN, Port+VLAN, IEEE 802.1p, IPv4/IPv6 TOS and DSCP), network-wide Call Admission Control (CAC), 8 Classes of Service (CoS)
Security	Access Control List (ACL), Radius, IEEE802.1x, SSH, SSA
Switching Fabric	Packet +TDM, Packet only
Topologies	Mesh, multi-ring, ring, star, linear
Management	LightSOFT NMS, EMS-NPT, SNMPv2/v3, LCT, CL, OpenFlow, NETCONF/YANG

Specifications subject to change without notice

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.