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ECI Apollo 9914/9932

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PRODUCT ASSESSMENT REPORT - CORE PACKET-OPTICAL PLATFORM

REPORT SUMMARY

ECI announced new customer wins for its Apollo offerings in North America, and expanded channel partnerships in Latin America. Its acquisition by Ribbon is expected to increase its profile in the North American market.

SUMMARY

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Product Ratings
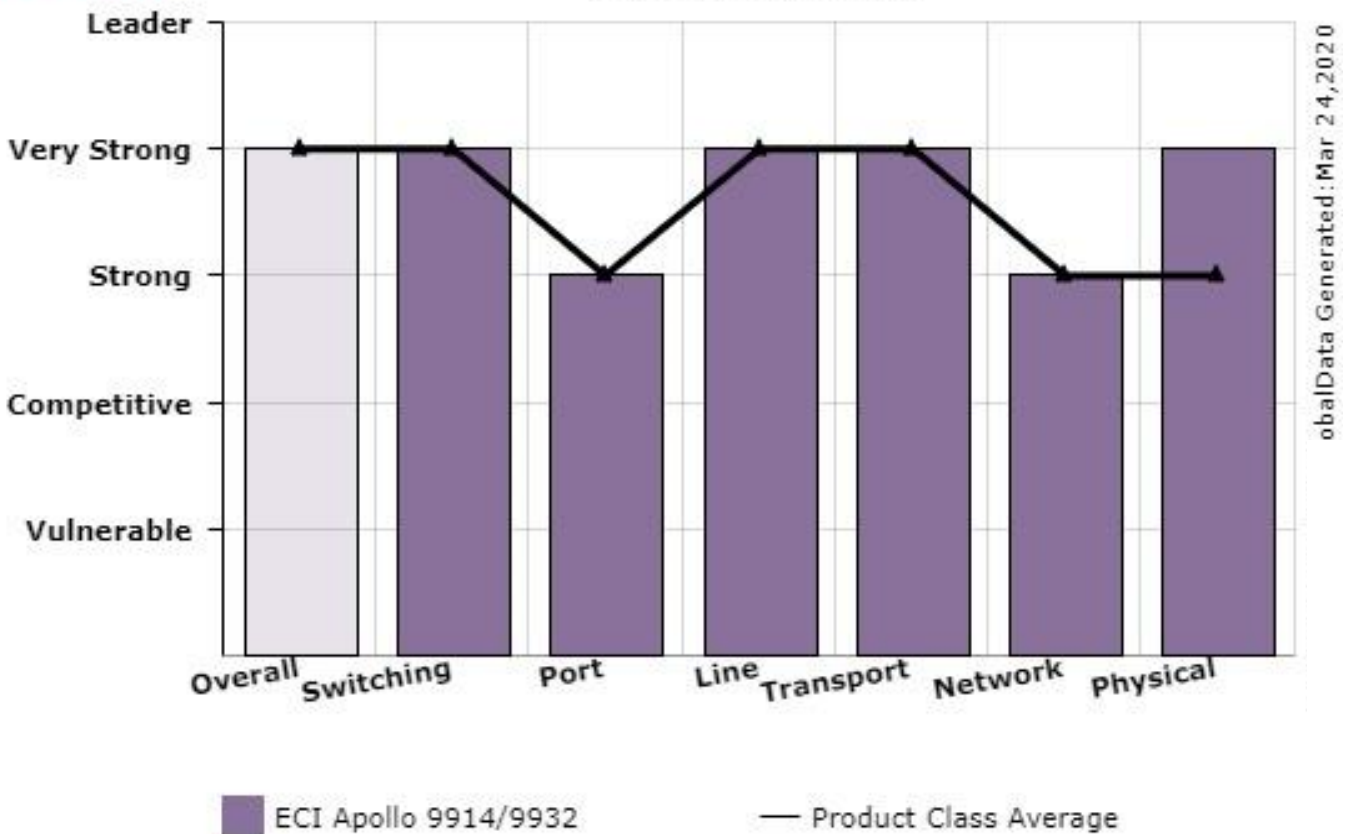
WHAT'S NEW

- **November 2019:** Ribbon Communications announced that it has entered into an agreement to acquire ECI, through a merger, for 32.5 million shares of Ribbon common stock and $324 million of cash. The acquisition is expected to close in Q1 2020.

- **October 2019:** ECI announced that along with its partner Edge Team Technology it won a contract to upgrade U.S. operator Wes-Tex's optical and IP infrastructure with ECI's Apollo and Neptune platforms.

- **September 2019:** ECI announced a partnership with WDC Networks, a value-added distributor of IT and Telecom services, to better serve Brazilian ISPs. By leveraging ECI's Apollo portfolio, the partnership will enable ISPs to provide affordable, high-speed broadband to underserved regions and rural communities.

- **August 2019:** ECI announced a new customer win through channel partner KGPCo to upgrade the network infrastructure of Iowa-based CL Tel, a telecommunications and broadband service provider, with its Apollo and Neptune portfolios.

PRODUCT OVERVIEW

Product Name	ECI Apollo 9914/9932
Description	ECI's Apollo is a family of optical transport and switching platforms designed to provide scalable and high-density packet-optical transport solutions from optical access, including optical CPE, to the core. The 9914 and 9932 represent top of the range, core packet-optical side of the Apollo family, and feature high OTN and packet switching capacities. The platforms serve large number of high-speed client ports, and feature high density of large capacity optical line interfaces including 100G, 200G, and 400G.
Components	• Apollo 9914 • Apollo 9932
Key Customers	• Bharti Airtel (India) • TI Sparkle (Italy) • Mobile TeleSystems (Russia) • TATA (India) • UPC (Romania) • Virgin Media (UK) • CEB FiberNet (Mauritius) • Wes-Tex Telephone Cooperative (U.S.) • SURFnet (Netherlands) • Deutsche Bahn (Germany) • Israeli Electric Corporation • Media Commerce (Columbia) • Bezeq International (Israel)

Key Rivals	• Ciena
	• Cisco
	• Fujitsu Network Communications
	• Huawei
	• Infinera
	• Nokia
	• ZTE

ESSENTIAL ANALYSIS

Strengths	Limitations
• **High OTN and Packet Switching Capacity:** The Apollo 9914 and 9932 deliver 5.6T and 16T of packet/OTN switching capacities in half-rack or full-rack footprint, respectively, providing for operators current scaling requirements. New line cards will extend platform capacity to 1T per slot (14T and 32T maximum scale, respectively).	• **Separate ROADM Chassis:** The Apollo series uses distinct platforms for optical amplification/ROADM, requiring additional rack space that could be used for client/ network interfaces.
• **Large Number of High-Speed Client Ports:** The Apollo family delivers high density of high speed client interface ports, such as 100G Ethernet and OTU-4, satisfying the needs of growing packet-based services, and allowing for efficient high-speed optical switching.	• **Lacks Backplane Extension:** The Apollo platforms do not offer backplane extensions, therefore limiting scaling of single node capacity in high-density deployments; additional scaling can be achieved by using a cluster of dedicated fabric cards.
• **SDN and Automation Features:** ECI's LightSOFT NMS and Muse SDN applications, coupled with LightPULSE integrated performance monitoring and LightINSIGHT network analytics, allow for rapid service set up, automation capabilities, and efficient operations and management.	• **Lacks SDH/SONET Grooming:** The Apollo family lacks SONET/SDH grooming (STS-1/3, or VC), restricting the ability to groom legacy SONET services and infrastructure, which is still important for legacy service support.

CURRENT PERSPECTIVE

VERY STRONG

ECI's Apollo Optical Transport and Packet Services platforms are very strong in the core packet-optical marketplace, based on their high switching capacity and port density and are offered in half-rack, or full-rack form factor. The Apollo family contains six platforms in total, three of which are configured as grooming/switching platforms (9904x, 9914, and 9932), while other three (9603, 9608, and 9624) host transponders/muxponders, optical amplification, and ROADMs. The Apollo 9914 and 9932 offer 5.6T and 16T, respectively, and are architected to scale to a maximum of 1T per slot in future releases, increasing capacity to 14T and 32T. Apollo platforms offer strong client port densities, and each configuration provides a comparatively large number of high-speed 10G and 100G Ethernet ports, as well as high density of OTU-2 and OTU-4 ports, enabling operators to efficiently multiplex a high number of high-speed services. ECI single-slot transport cards support D-CFP2 pluggables offering two 200G line interfaces using 16QAM modulation, or two 100G line interfaces, using QPSK, for a maximum of 160 100G, or 64 200G interfaces per shelf.

Apollo family is a part of ECI's Elastic Services Platform that includes Muse network and service application portfolio, LightSOFT NMS and LightPULSE real-time performance monitoring capabilities. ECI's software portfolio is focused on accelerating and simplifying service delivery, network planning, and management, and recent additions to the portfolio allow for multi-vendor integration on NMS level. LightPULSE functionality allows for real-time monitoring of OSNR and other network element performance characteristics, allowing for implementation of automation features.

On the negative side, Apollo family does not support SONET/SDH grooming, which may still be important to operators with a large legacy TDM service installed base. The Apollo family uses separate platforms for hosting optical amplifier and ROADM functionality, which may increase overall footprint required on a system level. Apollo 9914 and 9932 models also do not offer backplane extension option limiting node capacity scaling that can be required in high density deployments.

COMPETITIVE RECOMMENDATIONS

Provider

- **Quantify NB-IoT Capacities:** Even if products haven't received regulatory approval for their NB-IoT or LTE-M capabilities, be vocal in quantifying the specific IoT capacities of Nokia small cells, to reinforce that these capabilities are real.

- **Attack Rivals' Legacy Product Designs:** Argue that Ericsson's Radio Dot System and Huawei's LampSite were originally introduced more than half a decade ago, giving them an outdated legacy design that is not well suited to the 5G era. Contrast this with AirScale Indoor Radio features such as 4G/5G radio-unit cascading as an example of a design that is optimized for the 5G era.

- **Promote SFN More:** Devote more effort to promoting the AirScale Indoor Radio's SFN capability (single frequency network- multiple transmitters simultaneously sending the same signal over the same frequency channel, creating a unified logical cell). This could be effective in countering similar messages promoted rigorously by competitors CommScope and Ericsson.

Competitors

- **Concentrate on Maximum Performance:** Competitors with higher-performance platforms, like Huawei, should emphasize their platforms' current performance lead in per-wavelength transport capacity, and higher switching capacity in the same footprint as ECI Apollo.

- **Compare Automation Capabilities:** Vendors such as Nokia, Huawei, and Infinera should extoll the real-life automation capabilities of their platforms and associated software solutions, in comparison with ECI's Elastic Services Platform.

- **Emphasize Legacy Support and Port Diversity:** Vendors with platforms that feature SONET/SDH grooming support, like Ciena, and greater client port diversity, like Huawei and Infinera, should emphasize their solutions' better support for legacy, data center, and content delivery services.

Buyers

- **Evaluate ECI's Automation Solutions:** Operators should consider the benefits of automated service provisioning, network monitoring, analytics, planning, and maintenance supported by ECI's software portfolio, and real-time network element performance monitoring.

- **Consider End-to-End Capabilities:** Operators should evaluate the Apollo family's support for end-to-end optical transport deployments. ECI already offers programmable throughput with flex-grid and programmable line rate capabilities. The new contentionless ROADM brings programmable wavelength routing to the next level for a more flexible, end-to-end set up.

- **Consider Service Transformation:** Operators with large legacy installed base should re-examine their service transformation plans, and weigh the pros and cons of maintaining legacy infrastructure alongside the newly installed equipment supporting advanced high capacity services.

Metrics

SWITCHING CAPACITY AND FEATURES

Rating:	Very Strong
OTN Switching Capacity:	Apollo 9914: 5.6 Tbps Apollo 9932: 16 Tbps (32 Tbps ready)
OTN Switching Granularity:	ODU0, ODU1, ODU2, ODU2e, ODU3, ODU4, ODUflex
SONET/SDH Grooming:	No
Packet Switching Capacity:	Apollo 9914: 5.6 Tbps Apollo 9932: 16 Tbps (32 Tbps ready)
Backplane Extension:	N/A

Maximum System Scalability:	Apollo 9914: 11.2 Tbps Apollo 9932: 32 Tbps
Core Layer 2 Transport Support:	ELINE lite Packet support
Packet Protection:	LAG
Switch/Router Integration:	N/A

PORT CAPACITIES

Rating:	**Very Strong**
Maximum OC-3/ STM-1 Ports:	Apollo 9914: 448 Apollo 9932: 1024
Maximum OC-12/ STM-4 Ports:	Apollo 9914: 448 Apollo 9932: 1024
Maximum OC-48/ STM-16 Ports:	Apollo 9914: 448 Apollo 9932: 1024
Maximum OC-192/ STM-64 Ports:	Apollo 9914: 336 Apollo 9932: 768
Maximum OC-768/ STM-256 Ports:	N/A
Maximum OTU-1 Ports:	N/A
Maximum OTU-2 Ports:	Apollo 9914: 560 Apollo 9932: 1280
Maximum OTU-3 Ports:	N/A
Maximum OTU-4:	Apollo 9914: 70 Apollo 9932: 160
Maximum 1GEthernet Ports:	Apollo 9914: 448 Apollo 9932: 1024
Maximum 10G Ethernet Ports:	Apollo 9914: 560 Apollo 9932: 1280

Maximum 100GEthernet Ports:	Apollo 9914: 56 Apollo 9932: 160
Other Interfaces:	Apollo 9914: Fiber Channel FC1/FC2: 448 FC4: 224 FC8: 280 FC10: 280 Apollo 9932: Fiber Channel FC1/FC2: 1024 FC4: 512 FC8: 640 FC10: 640

LINE INTERFACES

Rating:	Very Strong
Maximum 10G Interfaces:	Apollo 9914: 280 Apollo 9932: 640
Maximum 40G Interfaces:	N/A
Maximum 100G Interfaces:	Apollo 9914: 56 Apollo 9932: 160
Maximum 200G Interfaces:	Apollo 9914: 28 Apollo 9932: 64

TRANSPORT FEATURES

Rating:	Very Strong
Wavelength Capacity:	96 or flex Grid (128 max)

100G Regenerator Span:	>5000km
Network Level Protection:	ASON (ODU level) and WSON (wavelength or line level), SNC DNI and DRI, OLP and OMSP, LAG for lite packet
Progress to Higher Capacity Systems:	The Q2 2019 introduction of the TM1200 supports dual 50G to 600G on a single wavelength, with 50G increments, to maximize traffic carrying capacity based on distance (available in 9904x). In Q4 2019 a version of the TM1200 will support a 400GE client interface. In future: 1T cards that will double max capacity per slot from current 500G cards; incorporating 400G ZR DCO pluggables for higher density and lower cost; 400G ZR DCO pluggables for higher density and lower cost.

NETWORK MANAGEMENT

Rating:	Strong
EMS:	STMS
OSS Support:	CLI, SNMP, CORBA (via LightSOFT), and NETCONF/YANG
Control Planes:	GMPLS

PHYSICAL ATTRIBUTES

Rating:	Very Strong
Chassis Dimensions:	Apollo 9914: 22RU, 19" rack, 12" depth Apollo 9932: Full ETSI rack, 12" depth
ROADM Size:	ROADMs available in OPT9600 platform: Single slot 9-degree ROADM and single slot dual amplifier enable four complete degrees in a single 5RU chassis. Smaller configurations available for locations with reduced need. Supports a full range of broadcast-and-select and route-and-select ROADM architectures, from 2 to 21 degrees, with full CDC-F capabilities.
Power Requirements:	Apollo 9914: 3538 W (0.63 W/G), maximum: 5.5 kW (0.98 W/G) Apollo 9932: 7.3 kW (0.46 W/G), maximum: 14.4 kW (0.90 W/G)