



# Apollo 9904X

## Pay as you grow Metro OTN Switch

Apollo 9904X makes it economical to extend the benefits of OTN switching to metro networks; namely, for grooming multiple layer 1 services onto fewer wavelengths, rapid software-controlled service provisioning, and dynamic restoration. Its unique integrated fabric design enables pay-as-you-grow capacity expansion in 700G increments, up to 2.8T, without having to invest in separate switching cards. Its 400G CFP2 DCO line interfaces likewise deliver capacity with economy. The 9904X also aggregates L2 traffic to reduce the number of costly router ports, and assigns bandwidth dynamically to this traffic using ODUflex.



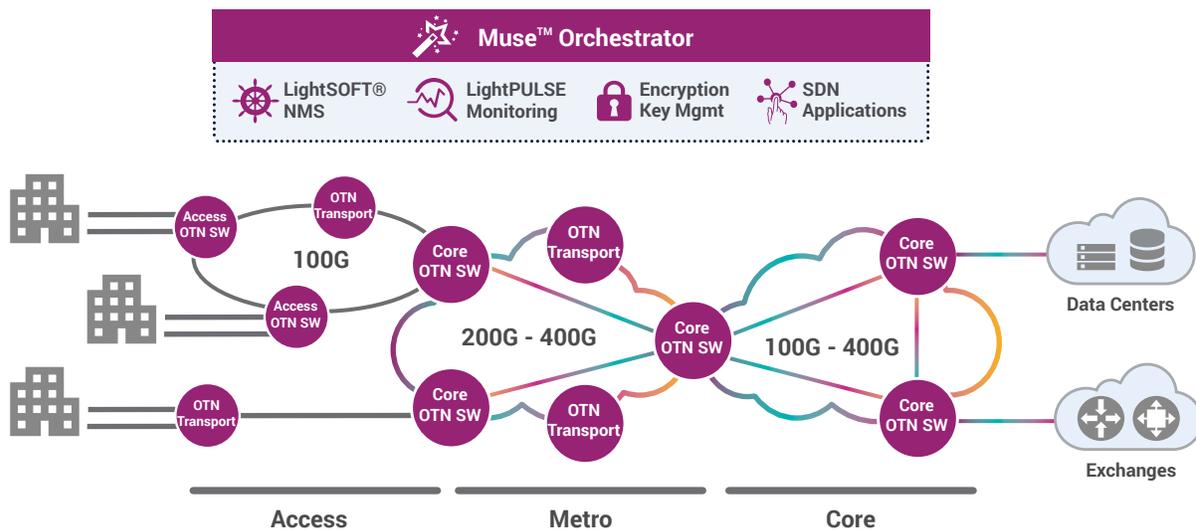
Apollo optical transport and switching platforms combine to deliver high-performance access-to-core optical networking solutions at the lowest cost per bit. Highly modular, they are tailorable into solutions that precisely meet current needs, and can evolve economically to accommodate traffic growth and new technologies. All Apollo platforms support multiservice client interfaces, as well as alien wavelengths, shared spectrum, and packet services. They are controllable through Muse Domain Orchestrator, or directly, via open industry-standard interfaces, and can stand by themselves in disaggregated networks such as for Open Optical Line Systems.

**OTN Switching**  
optimized for metro  
networks

**Integrated**  
packet  
services

**Self-aware**  
for E2E visibility  
and operability

**Open**  
for modular  
disaggregated solutions



## Technical Specifications

<b>Topologies</b>	Mesh, hub, ring
<b>Spectrum</b>	<ul style="list-style-type: none"> <li>Extended C-band</li> <li>Fixed grid: 50GHz/96ch, 75Ghz/64ch, 100GHz/48ch</li> <li>Flexible spectrum at 6.25GHz resolution</li> <li>Super-channel up to 128 channels</li> </ul>
<b>Capacity</b>	<ul style="list-style-type: none"> <li>Shelf: 4 slots for cards</li> <li>Card: 700G single slot</li> <li>Switching: 2.8T. Universal fabric for OTN switching (ODUk cross-connect 0, 1, 2, 2e, 3, 4, Flex) and L2 packet switching</li> </ul>
<b>Service and switching cards</b>	<p>MIO700: 700G capacity with integrated switching</p> <ul style="list-style-type: none"> <li>2 x CFP2 supporting 100G/OTU4, 200G/OTUC2, 300G/OTUC3, 400G/OTUC4</li> <li>3 x QSP28 supporting 100GbE/OTU4</li> <li>6 x QSFP+ supporting 10G/OTU2, 10GbE, 40GbE, SDH/SONET (STM-64, OC192)</li> </ul> <p>MIO200: 200G capacity with integrated switching</p> <ul style="list-style-type: none"> <li>1 x CFP supporting 100G/OTU4 (coherent), 10 x 10 banded OTU4, 100GbE</li> <li>12 x SFP/SFP+ supporting L1 or L2 Ethernet (GbE, 10GbE), SAN (FC1/2/4/8/10/16), OTU2/2e, SDH/SONET (STM-1/4/16/64, OC3/12/48/192), OTDR SFP</li> </ul>
<b>Switching fabric</b>	Switching is integrated in MIO backplane for a unique pay-as-you-grow architecture.
<b>Coherent interoperability</b>	OpenFEC and Staircase FEC support
<b>Optical card support</b>	Amplifiers, OMSP, OLP, ROADM 4FS with built-in amplifiers
<b>Synchronization</b>	SynchE and 1588V2 ready
<b>Security and Encryption</b>	AES256-GCM encryption; Diffie-Hellman key exchange with X.509 node authentication, enhanceable with PQC algorithms; CC EAL2
<b>Restoration</b>	<ul style="list-style-type: none"> <li>Spectrum Switched Optical Network (SSON) – spectrum level</li> <li>Wavelength Switched Optical Network (WSON) – wavelength level</li> <li>Automatic Switched Optical Network (ASON) – service level</li> <li>ODU SNC-N protection</li> </ul>
<b>HW redundancy</b>	<ul style="list-style-type: none"> <li>Power supply and fan redundancy modules</li> <li>High availability RCP main shelf controller</li> </ul>
<b>Dimensions</b>	<ul style="list-style-type: none"> <li>ANSI 19" rack: 221 mm height x 253 mm depth, 5RU</li> <li>Front access to all cards</li> </ul>
<b>Power input</b>	-40.5 VDC to -75 VDC
<b>Environmental</b>	<ul style="list-style-type: none"> <li>Operating temperature: -5°C to +55°C</li> <li>Relative humidity: 5% to 90% (non-condensing)</li> </ul>
<b>SDN</b>	Muse™ applications (e.g. Bandwidth on Demand, Scheduled Service)
<b>Network management</b>	LightSOFT® end-to-end, point-and-click network management
<b>Performance monitoring</b>	LightPULSE™ integrated real-time OSNR and other parameters
<b>Control interfaces</b>	Netconf/Yang open standard interface for native and 3rd party MNG

*Specifications subject to change without notice*

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