

WaveLogic™ 5 Nano 100G–400G Universal QSFP-DD

Ciena’s WaveLogic 5 Nano (WL5n) 100G–400G Universal QSFP-DD transceiver incorporates Ciena’s advanced coherent optical technology to deliver the power, space, and modularity benefits of pluggables across the widest range of applications, all with a single product. With embedded amplification and support for both interoperable and high-performance transmission modes, the WL5n Universal QSFP-DD is optimized for ease of deployment across access and aggregation, single-span Data Center Interconnect (DCI), and metro/regional transport, over all types of photonic line systems.

What is the WL5n 100G-400G Universal QSFP-DD?

The WL5n Universal QSFP-DD is a coherent pluggable transceiver that supports up to +4dBm Tx launch power via an integrated Erbium-Doped Fiber Amplifier (EDFA). This EDFA, together with an integrated Tunable Optical Filter (TOF), enables efficient operation over all line systems—including colorless and brownfield environments—and alongside earlier generations of coherent wavelengths. With support for both interoperable and performance-enhanced transmission modes, and support of adjustable capacity from 100G to 400G, WL5n Universal QSFP-DD offers maximum flexibility for deployment options.

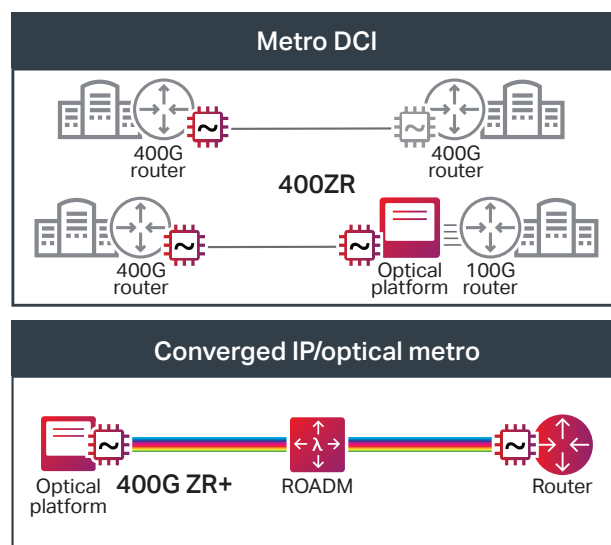
Ciena’s WL5n Universal QSFP-DD is the result of continued investments in vertical integration and innovation in component-level design. At the heart is the WL5n Transceiver-on-Chip (ToC): a multi-chip module comprising Ciena’s 7nm CMOS coherent DSP and High-Bandwidth Coherent Optical Sub-Assembly (HB-COSA) mounted onto a common substrate and jointly

packaged. The HB-COSA electro-optics include the RF components—Driver and Trans-Impedance Amplifier (TIA)—as well as silicon photonics modulator/demodulator. The ToC is a key foundational element enabling very compact, coherent pluggable form factors with the flexibility to provision for multiple different networking applications all from the same product.

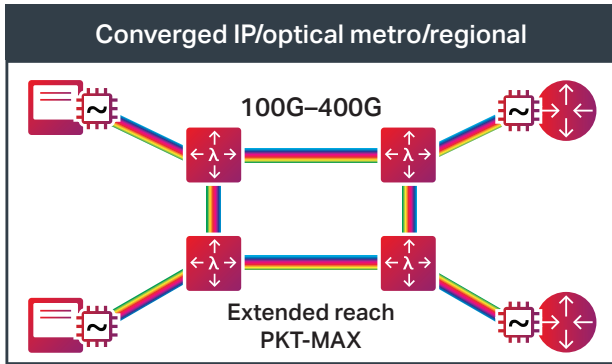
Where does WL5n 100G-400G Universal QSFP-DD fit?

Including the broadest range of transmission modes in the WL5n family, the WL5n Universal QSFP-DD enables reliable, practical deployment across a wide range of applications: Converged IP/optical metro and metro-regional transport, single-span DCI, high-capacity edge interconnect, and access aggregation, including dark fiber extension.

For packet-optimized, interoperable transport, WL5n Universal QSFP-DD supports both OIF-compliant 400ZR for single-span DCI and Multi-Source Agreement (MSA) 400ZR+ for extended-reach, multi-span transport.

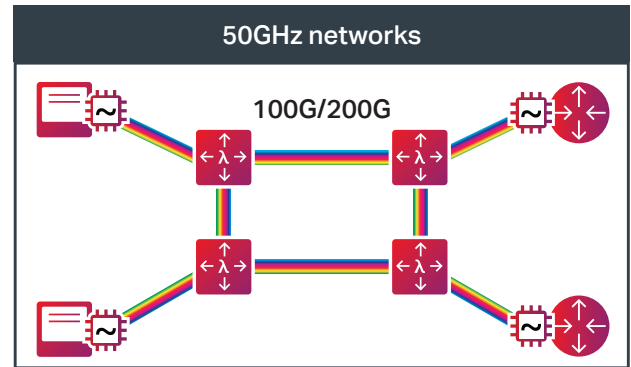


To meet needs of longer reach and challenging link environments, industry-leading high performance PKT-MAX transmission modes leverage Ciena's Probabilistic Constellation Shaping (PCS) to deliver maximum span coverage for Ethernet transport.

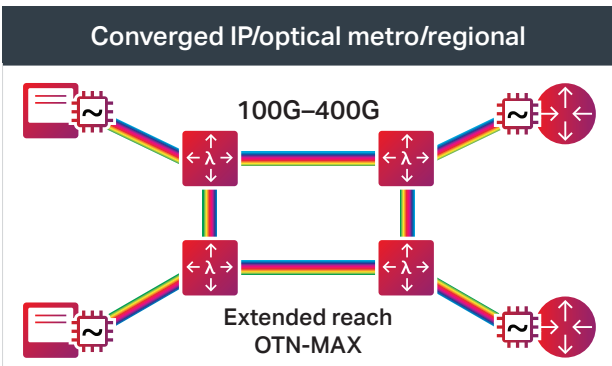
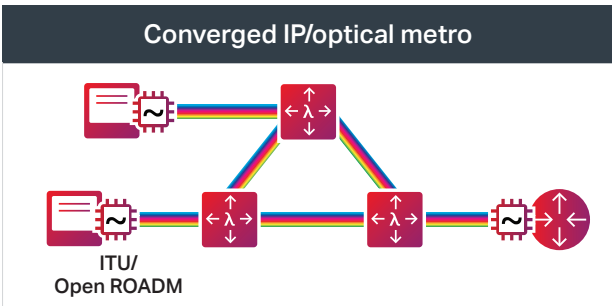


For metro Reconfigurable Optical Add/Drop Multiplexer (ROADM) networks, WL5n Universal QSFP-DD supports Optical Transport Network (OTN) modes for both ITU-T/FlexO and Open ROADM MSA-based interoperability as well as performance-enhanced OTN-MAX modes for maximum reach, all from a QSFP-DD Type 2A form factor.

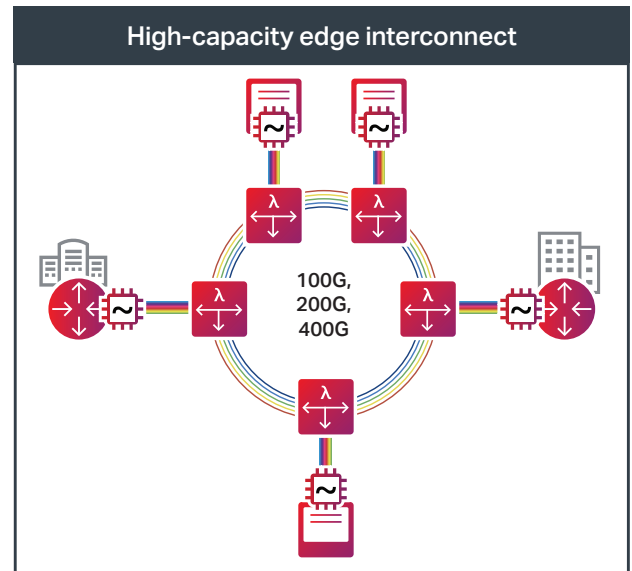
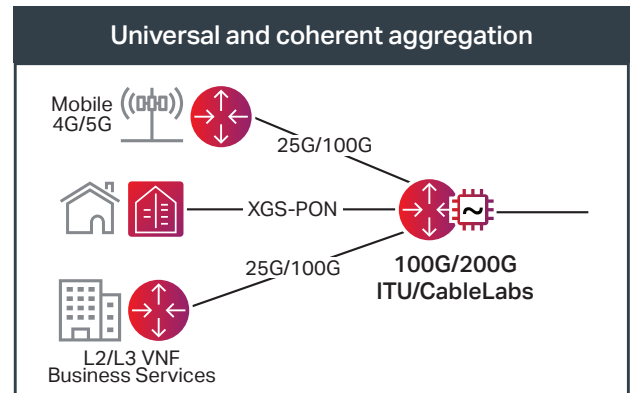
evolve and reduce energy consumption in existing 50GHz fixed-grid networks, using the lower baud transmission options (31.5GBd, 35GBd) of the product to deploy lower power, lower cost 100G/200G wavelengths.



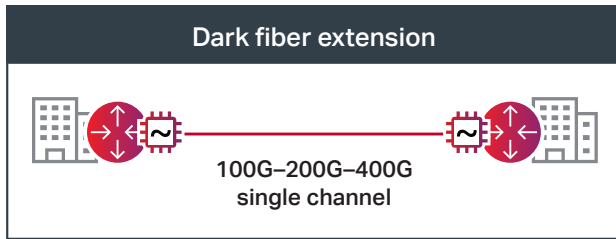
For access applications, where platforms are optimized for faceplate density, and multi-vendor interoperability delivers needed deployment flexibility, the WL5n Universal QSFP-DD provides 100G and 200G transmission compliant to the ITU-T FlexO standards and 200G CableLabs specification.



Facilitating the evolution to a converged IP/Optical architecture, the embedded EDFA/TOF in a QSFP-DD form factor enables extended reach and simple deployment over any type of photonic line system, including CDC and brownfield deployments, and alongside earlier generations of coherent wavelengths. In addition to using the WL5n Universal QSFP-DD for network upgrades to 400G, network providers can also



Furthermore, with amplification embedded into the product, network providers can also scale to 400G capacity in dark fiber applications, without the need to deploy in-line amplification equipment.



WL5n 100G-400G Universal QSFP-DD coherent pluggables are supported across a range of Ciena's optical and routing and switching platforms as well as select third-party host platforms. With WL5n in Ciena systems, service providers benefit from the power, footprint, and granular capacity benefits associated with pluggables, as well as the photonic-layer integration and link-budget guarantees needed to accelerate and optimize network deployments.

Why WL5n 100G-400G Universal QSFP-DD?

With this product, users can:

- Sustainably evolve more links of their network with smaller/lower power 400 Gb/s wavelengths, achieved through the industry's highest performance 400G pluggables
- Deploy in both transport and router platforms, facilitating the evolution to converged IP/Optical architectures
- Realize operational savings related to reduced footprint and energy consumption in metro/regional applications for sustainable network upgrades
- Reduce transport costs of existing brownfield networks, with the ability to deploy coherent pluggables over any type of line system, including CDC, and to deploy alongside earlier generations of coherent wavelengths
- Support multi-vendor environments, through transmission mode support for interoperable standards and MSAs
- Reduce operational costs, including certification and sparring, with a single pluggable that is deployable in numerous applications, in either a router or transport platform, and over any type of line system

Key features include:

- Single carrier transmission:
 - 100/200/300/400 Gb/s
 - 50/75/100 GHz grid compliant
 - Flexible grid compliant
- PCS-16QAM, 16QAM and QPSK modulation
- 31.5, 35, 58, 60, 63, 65, 70 GBaud symbol rate
- High Tx launch power (up to +4dBm)
- Client support:
 - 100/200/400GE
 - OTU4, OTNc/FlexO
- Management interface
 - OIF CMIS-compliant I2C
- Form factor: QSFP-DD (Type 2A)



Summary

Ciena's WL5n coherent pluggables bring the strength of coherent optics into compact form-factor solutions that support a wide range of efficient transport options. With WL5n 100G-400G Universal QSFP-DD, you can sustainably transition a large part of your network infrastructure to lower power and cost/bit. You can deploy WL5n 100G-400G Universal QSFP-DD without compromise in either router or optical platform and across any type of photonic line system. Along with support for both interoperable modes underpinned by global standards and MSAs, as well as unmatched performance-enhanced modes for extended reach-capacity in pluggable form, you have maximum flexibility with WL5n 100G-400G Universal QSFP-DD.

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