INFOBRIEF

WaveLogic™ 6 Extreme

Evolving Networks to 1.6 Tb/s Transmission and Ubiquitous 800G Networking

Providing ubiquitous 800G connectivity and ultimate wavelength capacity of up to 1.6 Tb/s, WaveLogic 6 Extreme (WL6e) brings the innovation you need to make meaningful impacts in network scale, economics, and power efficiencies. And with the ability to operate with existing network assets, you can more quickly and simply reap these benefits.

What is WaveLogic 6 Extreme?

Building from Ciena's WaveLogic 5 Extreme (WL5e), which brought the first programmable 800G coherent technology to the industry and enabled global 400G network deployments, WL6e provides the next leap forward in required performance and economics with programmable 1.6 Tb/s coherent technology—enabling ubiquitous 800G networking.

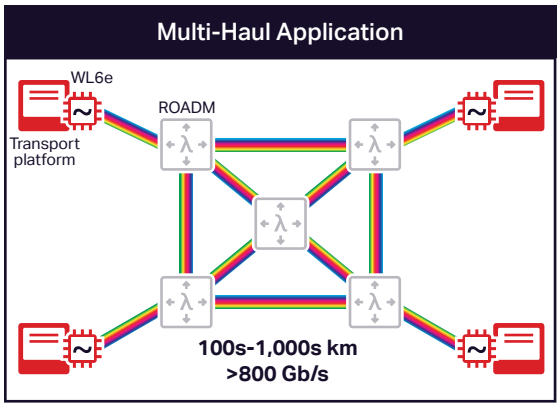
Part of Ciena's sixth-generation coherent optical solutions, WL6e integrates advanced CMOS, new DSP innovations, and high-bandwidth 200 GBaud electro-optics to deliver ultimate fiber capacity with less equipment. With programmable capacity up to 1.6 Tb/s, WL6e provides a step-function improvement in both scale and economics, delivering at least double the capacity per wavelength compared to WL5e. Furthermore, new DSP enhancements push coherent optical performance closer to the Shannon limit, with 15% typical expected spectral efficiency improvement compared to WL5e, and even higher improvements in nonlinear environments.

This capacity increase translates to 1.6 Tb/s for metro ROADM applications, 1.2 Tb/s wavelengths across regional distances, and 800 Gb/s for ultra-long-haul and uncompensated submarine applications. Ready for next-generation router architectures, WL6e allows for ubiquitous and efficient 800G client connectivity—from across the metro to across the Pacific.

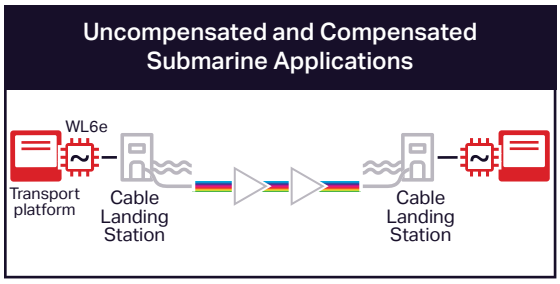
Where does WaveLogic 6 Extreme fit?

WL6e provides benefits in multi-haul (metropolitan and long-haul) and submarine applications, and in all networks with scarce fiber assets where spectral efficiency is a top requirement.

In multi-haul applications, where network providers are increasingly moving to more software-driven, automated, and highly scalable networks, WL6e supports the highest traffic flows—up to 1.6 Tb/s per wavelength and unmatched programmability with granular, variable baud and adjustable line rates. WL6e also facilitates network evolution to next-generation, higher-capacity switching technologies, with efficient 800G client connectivity across any distance: from two 800G clients on a 1600G wave for metro deployments, to three 800G clients mapped across two 1.2T waves for regional applications, to a single 800G wavelength across ultra-long-haul distances.



Using WL6e in submarine applications, network providers gain unprecedented spectral efficiency and ROI for submerged cable assets. For the first time, operators can support 800G client connectivity across subsea links, even across transpacific distances. In today's environment, where traditional cables are challenging to upgrade, WL6e brings important benefits for submarine cable owners for both compensated and new uncompensated submarine cables. WL6e integrates DSP algorithms specifically designed for all cables, so operators can now upgrade all assets with one technology and achieve more capacity at lower cost, space, and power.



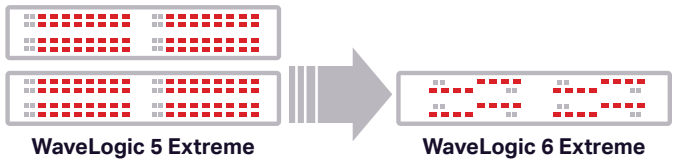
Designed with ease of technology adoption in mind, WL6e-based transponders are supported in existing 6500 and Waveserver® 5 chassis, with no changes required from a power-supply and thermal-management perspective. WL6e can be deployed in existing flexible-grid line systems, including the 6500 and 6500 Reconfigurable Line System (RLS), alongside earlier-generation coherent wavelengths. Users gain step-level improvements in network scalability and economics, all while leveraging existing network assets.

Why WaveLogic 6 Extreme?

With WL6e, you can:

- Massively scale your network at the right cost points to drive your business forward
- Evolve to next-generation switching silicon with efficient 800G client connectivity across the longest links
- Access more opportunities, with the ability to offer innovative high-bandwidth services via higher-capacity wavelengths that can extend over longer, unregenerated distances
- Make faster progress toward achieving environmental targets through deployment of hardware that allows for double wavelength capacity within the same footprint and 50% reduction in power per bit
- Gain operational efficiencies, with fewer wavelengths to manage
- Easily adopt state-of-the-art technology, using existing network assets

12.8T Capacity Example



WaveLogic 5 Extreme (800G) → **WaveLogic 6 Extreme (1600G)**

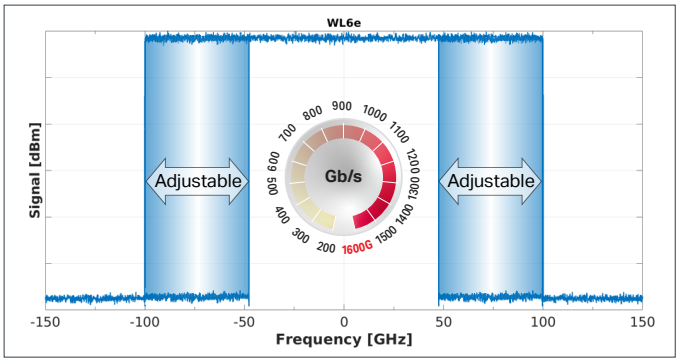
50% reduction in space and power

50% fewer transponders to deploy

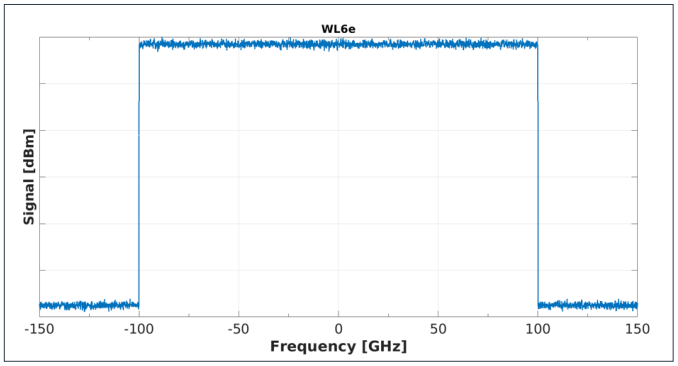
How does WaveLogic 6 Extreme deliver industry-leading system performance?

WL6e efficiency improvements are enabled via a vertically integrated, co-optimized 200 GBaud design using state-of-the-art, but also tested, technologies—such as 3 nm CMOS, and high-bandwidth silicon photonics and indium phosphide-based electro-optics. Performance and spectral efficiency improvements are achieved via DSP enhancements, such as:

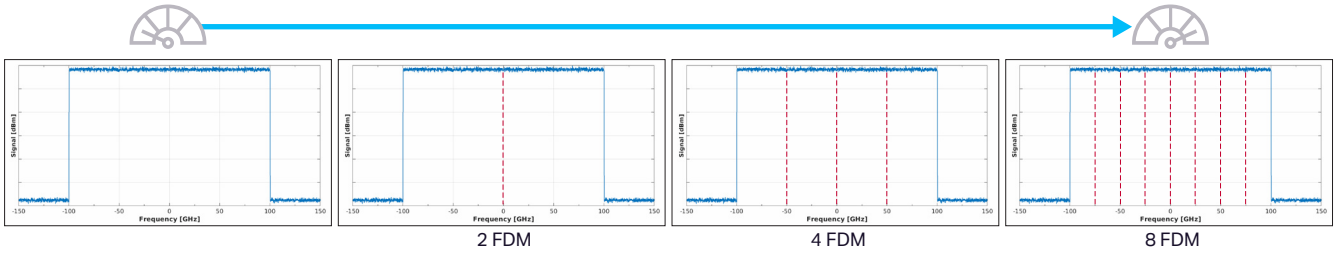
- **Edgeless Clock Recovery,** which provides near-perfect rectangular shaping, and allows for greater throughput within the same amount of spectrum.



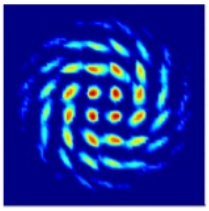
- **Granular Adjustable Line Rates,** up to 1.6 Tb/s, which, together with Variable Baud (95–200 GBaud), allows for the optimal balance between capacity and spectrum based on client connectivity, network link characteristics, and channel spacing.



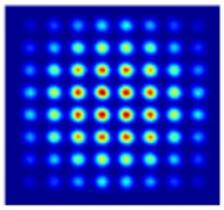
- **Variable Frequency Division Multiplexing,** with the ability to intelligently implement one, two, four, or eight electrical subcarriers and optimize performance based on the dispersion of the link.

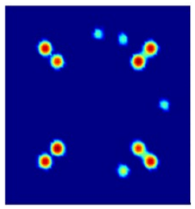


- **Nonlinear Impairment Compensation,** improving capacity and/or reach of transmission in high nonlinear environments, such as low-dispersion fiber and dispersion-managed submarine links.

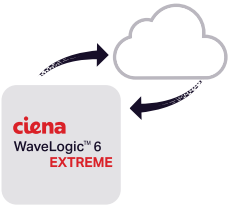


- In addition to **Probabilistic Constellation Shaping**, WL6e also includes **Multi-Dimensional Modulation**, which enables improved performance for links with high noise and high nonlinearity, such as compensated submarine cables.





- **Real-Time Sensor**, using dedicated hardware acceleration for performance monitor telemetry streaming with hardware timestamping, at ≤1sec cadence, allowing for real-time visibility of the smallest event and speedy localization of any disturbance.



- **Advanced Integrated AES-256 Encryption,** leveraging a proven implementation to deliver a quantum-resistant encryption solution.

A complete solution

Ciena is committed to helping customers leverage the full potential of coherent technology and realize networks that can readily adapt to change. As the pioneers of coherent technology for commercial optical systems, Ciena's solutions combine deep expertise in both coherent technology and systems design. By owning all the foundational coherent technology elements—including DSP, converters, high-bandwidth silicon photonics, and indium phosphide electro-optics—Ciena can uniquely provide the innovation, time to market, and cost benefits network providers are demanding. Beyond the optics, Ciena offers a fully instrumented photonic layer with sophisticated optical software control, platforms with modern open APIs, and Liquid Spectrum™ apps to enable a fully programmable infrastructure. Finally, Ciena is one of very few solutions vendors in the industry with the financial strength and global scale to continue to drive and deliver the fast cadence of innovative solutions network providers need.

Summary

Optimized for 800G client connectivity and ultimate network scale through leading technology as well as ease of deployment, WL6e delivers:

- Up to 1.6 Tb/s per wavelength
- 800G connectivity across virtually all network links
- 2 times capacity per wavelength*
- 50% reduction in power per bit*
- 15% increase in spectral efficiency*

Ciena's vertical integration, with control over all critical design components, means that you get an optimized design and cost savings, as well as faster introduction of new technology with its many benefits into your network. With WaveLogic 6 Extreme, Ciena brings the coherent innovations and supporting evolution paths needed to address the networking requirements of the future.

* Compared to WaveLogic 5 Extreme

Was this content useful? ◯ Yes ◯ No