ENHANCING POWER EFFICIENCY AND LATENCY OPTIMIZATION

- Strategies and Solutions for Superior Performance

SOLID OPTICS

STRATEGIES FOR ACHIEVING LOW LATENCY AND REDUCING POWER CONSUMPTION

In today's landscape, where optimizing resources and embracing eco-friendly solutions are paramount, this guide is focused on fine-tuning both performance and energy efficiency in fiber networking solutions. By harnessing advanced technologies and precision configurations, our primary goal is to significantly reduce latency in data transmission, ensuring faster, more responsive networking experiences while also minimizing energy consumption.

In the following pages, we'll explore strategies for reducing latency in data transmission. Additionally, we'll spotlight transceivers and cables that excel in conserving power.

This approach not only enhances the overall performance of our fiber networking solutions but also demonstrates our commitment to reducing costs along for a sustainable future by actively reducing energy consumption.

OPTIMIZING LATENCY

Strive for Efficiency, Minimize Latency - Your Path to Peak Performance.

OPTIMIZING LATENCY FOR PEAK PERFORMANCE

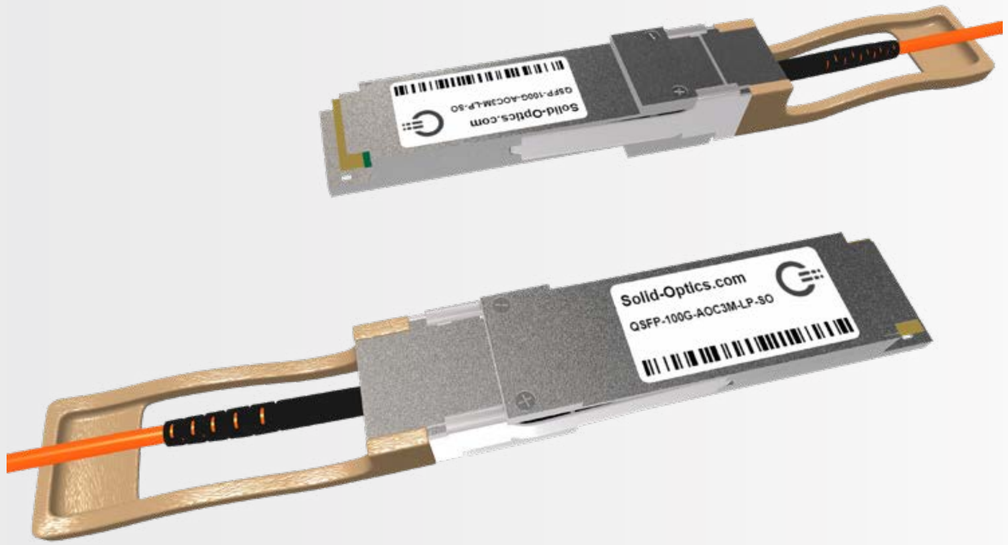
Key Strategies:

Choosing the Right Cables:

Investing in high-quality cables is paramount for minimizing signal loss and preserving signal integrity, leading to lower latency. The careful consideration of cable type is essential to effectively optimize latency across diverse applications. Selecting cables engineered for performance ensures a reliable and efficient data transmission process.

Optimizing Cable Length:

Reducing cable length has a direct impact on communication speed, as it minimizes the time required for data to traverse from source to destination. Organizations can significantly enhance the speed and overall performance of their data transmission by strategically optimizing cable lengths.



OPTIMIZING LATENCY

LATENCY COMPUTATION

- Understanding and Calculating Network Response Times

The latency on a fiber run can be calculated using the Index of Refraction (IOR) of the fiber.

The basic formula is Distance = Speed of light / IOR.

G654.C ULTRA LOW LOSS

Distance = 299.792.458 meters per second / 1.462 so 205.056.401 meters per second (rounded)

Effective Group Index of Refraction (n_{eff})	1310nm: 1.4606
	1550 nm: 1.4620

G652.D FULL BAND

Distance = 299.792.458 meters per second / 1.467 so 204.357.504 meters per second (rounded)

Effective Group Index of Refraction (n_{eff})	1310nm: 1.466
	1550 nm: 1.467

Based on the above, 100km will have a latency of 487670 nanoseconds in G654.C, and 489338 nanoseconds in G652.D.

OPTIMIZING LATENCY

ENHANCING LATENCY PERFORMANCE WITH BEND INSENSITIVE PATCH CABLES

- Leveraging bend insensitive patch cables offers substantial advantages

Optimized Cable Length:

Achieve a significant reduction in the average length of patch cables, minimizing it by 0.5m.
This reduction directly translates to a remarkable decrease in latency, approximately 2.5 nanoseconds per cable.

Ideal for Data Centers and Colocation Facilities:

Particularly advantageous in environments with extensive cable infrastructure, such as data centers or colocation facilities.
Bend insensitive fibers enable more streamlined installations, accommodating higher cable density.

Increased Installation Density:

The unique bend insensitivity allows for higher fiber density within the same spatial constraints.
This expanded capacity facilitates enhanced data transmission, accommodating a greater number of fibers within a confined space.

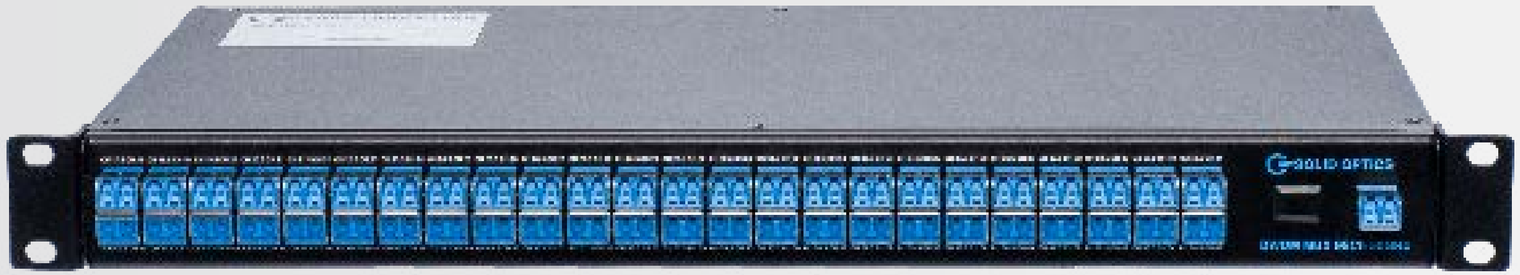
OPTIMIZING LATENCY

ENHANCING LATENCY PERFORMANCE WITH CUSTOM MUXs

CUSTOM MULTIPLEXER/DEMULTIPLEXER (MUX) UNITS:

Maximize the efficiency of Dense Wavelength Division Multiplexing (DWDM) applications by incorporating custom Multiplexer/Demultiplexer (MUX) units.

Tailored specifically to your requirements, custom MUXs incorporate strategically designed internal fibers, resulting in a significant reduction in latency by approximately 11 nanoseconds. This specialized design ensures optimal performance in data transmission, contributing to the overall effort to minimize latency in sensitive environments.



OPTIMIZING LATENCY WITH TRANSCEIVERS

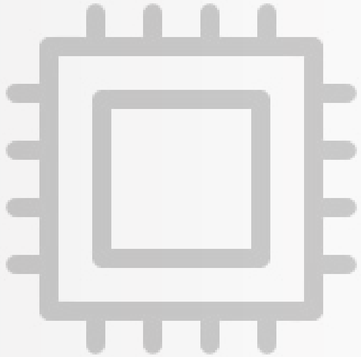
Careful consideration of transceiver types, such as Clock Detection Recovery (CDR) or Digital Signal Processing (DSP) based transceivers, can yield a substantial reduction in latency, typically ranging from 50% to 60%.

Navigating the Impact of Forward Error Correction (FEC):

It's essential to recognize that the implementation of Forward Error Correction (FEC) introduces additional latency. Therefore, opting for transceivers that do not require FEC becomes crucial for minimizing latency in your network architecture.

Unlocking Enhanced Performance with Clock Detection Recovery (CDR) Transceivers:

Experience superior signal integrity with our Clock Detection and Recovery (CDR) transceivers, employing advanced analog technology for optimized equalization and signal conditioning. These transceivers are the ideal choice for applications demanding low power consumption and reduced latency.



ENHANCING POWER EFFICIENCY

Improving Power Efficiency with CDR-Based Transceivers

ENHANCING POWER EFFICENCY

IMPROVING POWER EFFICIENCY WITH CDR-BASED TRANSCEIVERS

Harness the benefits of Clock Detection Recovery (CDR) technology for not just enhanced latency but also a substantial reduction in power consumption.
In contrast to DSP-based alternatives, CDR-based transceivers exhibit an impressive minimum power consumption reduction of 24%

Consider utilizing CDR-based transceivers, such as the following options:

100G eSR4: 100m without FEC
100G CLR4: 2Km without FEC
2x100G LR4 (QSFP-DD)
200G AOC
400G AOC Low Power

These options not only exemplify efficient power management but also provide specific solutions tailored to various networking requirements.

Get in touch

We hope this guide has offered a comprehensive insight into the optimization of both latency and power consumption in fiber networking solutions. Should you have any questions or need further assistance, we're just a call or an email away.

Thank you.

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