

How many seconds is the latency of a fiber optic switch



Summary of Content

The latency of a fiber optic switch typically ranges from a few nanoseconds to tens of nanoseconds, with total fiber propagation adding microseconds per kilometer.

Fiber Propagation Delay

The primary component of latency in fiber optics is the time it takes for light to travel through the fiber. Standard single-mode fiber (SMF-28) introduces approximately 4.9–5 microseconds per kilometer of one-way propagation delay due to the refractive index of the glass core, which slows light to roughly 200,000 km/s compared to its speed in a vacuum. For example, a 100 km fiber link would contribute about 0.49 milliseconds of one-way delay.

Switch and Transceiver Latency

In addition to propagation delay, fiber optic switches and transceivers introduce processing latency. Modern high-performance switches typically add a few nanoseconds to tens of nanoseconds per hop, depending on the architecture and whether Forward Error Correction (FEC) is used. FEC can increase latency further, sometimes by microseconds in high-speed links, but in ultra-low-latency environments, switches are optimized to minimize this overhead.

Total Latency Estimation

The total latency for a fiber optic switch includes:

- Propagation delay: $\sim 5 \mu\text{s}/\text{km}$

Article Content

How much latency in optical fibre : r/networking

Hi there, the latency in optical fibre is 5us (micro second) per 1km. It can be easily calculated from the speed of light, divided by the

Calculating Optical Fiber Latency

How to Calculate Optical Fiber Latency: this technical article from M2 Optics breaks down how optical fiber latency is calculated.

How to Calculate Fiber Optic Latency: A Comprehensive Guide

This exploration of fiber optic latency not only provides a basis for better understanding but also equips professionals

Fiber Latency Calculator

Use our accurate fiber latency calculator to determine propagation delay in fiber optic networks. Understand key factors like distance,

Fiber Optic Latency Calculator

Use this fiber optic latency calculator to estimate one-way, round-trip, serialization, transceiver, patch, and route delay for LAN,

Optical Fiber Latency & Delay Calculator

Calculate optical fiber latency from length, or find the exact fiber spool length required for a specific time delay. Includes SMF-28 and

Fiber Optic Latency: 5 us/km Calculator | PHILISUN

While this transceiver latency usually ranges from a few nanoseconds to tens of nanoseconds, it remains a relevant

Fiber latency calculator

The fiber latency calculator helps determine the time it takes for data to travel through a fiber optic cable between two

Fiber Latency Explained: Internet at the Speed of Light

Fiber optic connections deliver the lowest latency available in residential internet service. Light traveling through glass

The 5-Microsecond Rule: Fiber Propagation Latency per Kilometer

This produces what the industry calls the 5-microsecond rule — a practical baseline that one kilometer of single-mode fiber adds

Contact Us

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