

Single-fiber bidirectional 400G technology support



AI Overview

Single-fiber bidirectional 400G technology enables full-duplex 400 Gbps transmission over a single optical fiber using coherent transceivers and wavelength multiplexing.

Overview

Single-fiber bidirectional (BiDi) 400G technology allows simultaneous transmission and reception on a single fiber strand, effectively halving fiber usage compared to conventional two-fiber systems . This approach is particularly valuable in fiber-constrained environments, such as urban access networks, data centers, and high-capacity backhaul links.

Technical Approaches

- Coherent Digital Subcarrier Multiplexing (DSCM): Experimental demonstrations, such as the Allegro EU Project, achieved 400 Gb/s bidirectional transmission over a single fiber using DSCM with subcarrier interleaving to mitigate Rayleigh back-scattering, maintaining less than 1 dB power penalty over distances up to 20 km .
- Dual-Laser Coherent Transceivers: Commercial solutions, like the Cisco 400G Digital Coherent BiDi CFP2, use a dual-laser approach to separate transmit (Tx) and receive (Rx) wavelengths on a single fiber. These transceivers support software-configurable modulation and line rates, enabling flexible deployment for different reach and capacity requirements .
- DWDM Single-Core BiDi Solutions: Dense Wavelength Division Multiplexing (DWDM) devices can support 4 to 8 wavelengths at 400G over a single fiber, integrating with...

Article Content

Jan 22, 2026

Are you ready for 400G Ethernet?

Driven by large hyperscale and cloud data center providers, advancements in signaling and transceiver technology

Oct 20, 2025

Four Types of Typical 400G Network Solution Plan Explained

In order to respond to the market development and meet the high performance requirements of 400G networks, most

Oct 22, 2025

The Complete Guide to BiDi Transceiver

Thanks to technology miniaturization, Cisco is now able to offer a CFP2 DCO supporting up to 400 Gbps of line rate

Feb 19, 2026

Cisco 400G QSFP-DD Cable and Transceiver Modules

The Cisco® family of QSFP-DD modules provide the industry's highest bandwidth density

Nov 19, 2025

What is 400G? | Glossary | HPE

Emerging 400G equipment, such as optical transport products, compact connectors, high-speed optical transceivers,

May 04, 2026

Impact and Mitigation of Reflections in 400G Single-Fiber Bidirectional ...

We perform experimental evaluation and analytical modelling of the sensitivity penalty caused by discrete and

Mar 31, 2026

Understanding the Latest in 400g Transceiver Technology: Your

Explore our complete guide to 400G transceiver technology, including QSFP-DD modules and cables designed for

May 14, 2026

Improve Your Network Efficiency with 400G Optics

Enabling Technologies Silicon Photonics Drives Efficiency Integration Many optical functions on a single monolithic die with high yield

Jul 26, 2025

Infinite Capacity Engine – Extensible (ICE-X) 400G XR QSFP-DD

ICE-X transceivers support industry-leading performance and a unique level of integrated intelligence and system-level functionality,

Dec 30, 2025

400G CFP2-DCO Optical Module

The 100G/200G/400G Dual fiber or BiDi CFP2-DCO coherent pluggable optical module from 3C-LINK .is based on DP-QPSK or DP

Mar 12, 2026

Cisco upgrades 400G optical receiver to boost AI infrastructure ...

Cisco recently took the wraps off a new optical receiver that lets data center customers better support AI and other

Jun 25, 2026

400G Transceiver Guide: Architecture, Selection & TCO for AI

The Definitive 400G Optical Transceiver Guide: Selection, Deployment, and TCO for 2025 The definitive guide to

Jul 26, 2025

Understanding 400G Transceivers and Cables: Key Questions

Explore definitions, applications, and data center usage of 400G transceivers and cables. Get knowledge of the new

Feb 03, 2026

400G QSFP-DD SR4.2: Enabling Network Upgrade from 100G to 400G

Multimode fiber offers cost-effective support for higher speeds over shorter distances, making it an ideal choice for

Oct 25, 2025

What is 400G optical networking? | Neos Networks

What is 400G? 400G is optical networking technology that can transfer data at speeds of up to 400 gigabits per

Aug 11, 2025

400G Era is Here: A Step-by-Step Breakdown of Upgrading Data

In this article, I share a comprehensive, step-by-step guide for upgrading your data center fiber cable infrastructure to

Feb 15, 2026

Allegro EU Project Demonstrates 400G Bi-Directional Transmission

Achieved bidirectional transmission at 400 Gb/s over a single fiber using coherent digital subcarrier multiplexing

Oct 23, 2025

400G QSFP-DD LR4 Optics: Architecture, Specs and Application

With QSFP-DD, a single switch can support dozens of 400G ports, significantly increasing total network capacity. This high density is

Jul 05, 2026

Single-Fiber Bidirectional Transmission using 400G Coherent Digital ...

We experimentally evaluate the Rayleigh Back-Scattering power penalty in a single-fiber single-wavelength bidirectional link using

Aug 19, 2025

Cisco 400G Digital Coherent BiDi CFP2 Data Sheet

Thanks to technology miniaturization, Cisco is now able to offer a CFP2 DCO supporting up to 400 Gbps of line rate that can cope

May 24, 2026

400G Multi-Mode Fiber: 400G SR4.2 vs 400G SR8

To support the short-reach application space inside data centers, the optical fiber industry developed two IEEE 400G

Apr 24, 2026

FAQ about 400G BIDI MSA

Optical bidirectional technology allows each single fiber to carry signals in both directions, thereby improving fiber utilization relative

May 18, 2026

400G DWDM Technology

What is 400G? 400G capacity over a single wavelength technology is suitable for new and expanding

Sep 03, 2025

ECOC 2024: Reflection Effects and Mitigation in 400G Single-Fiber ...

Conducted experimental measurements and modeling of interference effects due to Rayleigh backscattering and

Sep 26, 2025

Cisco 400 Gigabit Modules

The Cisco 400GBASE Quad Small Form-Factor Pluggable Double Density (QSFP-DD) portfolio offers customers a wide variety of

Contact Us

For more information, pricing, or custom solutions, please contact us:

Website: <https://ntmmgroup.co.za>

Email: sales@ntmmgroup.co.za

Phone: +27 82 471 2596

Address: Unit 7, Optic Park, 24 High-Tech Lane, Century City, Cape Town, 7441, South Africa

This document is for informational purposes only. Specifications subject to change without notice.

