

Long-distance interconnection of data centers



AI Overview

Long-distance data center interconnects (DCIs) use high-speed optical technologies like coherent optics and DWDM to connect geographically dispersed data centers, enabling high-capacity, low-latency data transfer over hundreds or thousands of kilometers. Overview of Long-Distance DCI Long-distance DCIs connect data centers across metro, regional, or even transcontinental distances, allowing organizations to share resources, replicate data, balance workloads, and implement disaster recovery strategies. Unlike intra-data center or campus interconnects, which typically span up to 10 km, long-distance DCIs can extend over hundreds or thousands of kilometers, often using single-mode optical fiber for low attenuation and high signal integrity. Key Technologies Coherent Optical Transmission: Coherent optics is the preferred technology for long-distance DCI because it supports high data rates and long reach. It uses advanced modulation formats and digital signal processing to maintain signal quality over extended distances. Dense Wavelength Division Multiplexing (DWDM): DWDM allows multiple data channels to be transmitted simultaneously over a single fiber by using different wavelengths of light. Combined with optical amplifiers, DWDM systems can achieve 400 Gbit/s per wavelength and beyond, making them ideal for high-capacity interconnects. Pluggable Standards: The 400ZR and 800ZR standards enable compact, high-speed optical modules for metro and long-distance DCIs. These modules allow dense deployment on router faceplates while supporting distances up to 80 km (400ZR) and beyond for 800ZR, facilitating scalable, interoperable solutions. Functional Considerations Long-distance DCIs support multiple connectivity types: LAN Extension: Extends Layer 2 domains across data centers for legacy applications or virtual machine mobility. Layer 3 Extension: Provides routed connect...

Article Content

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In 2026, the data center colocation market is being reshaped by six converging forces: power scarcity, AI-driven density requirements, modular

AI-First Hyperscalers: 2026's Sprint Meets the Power

Hyperscalers in 2026: What's Next for the World's Biggest Data Center Operators? In 2026, hyperscalers will accelerate AI-first buildouts while

AI Data Center Power Surge: Shifting Trends Toward

Executive Summary Rapid growth in artificial intelligence (AI) data center power demand is driving a resurgence in fossil fuel investment,

Texas AI Data Centers: Power, Policy, and Progress

How ERCOT policy, power-first models, and new networks are driving AI-scale data centers in Texas. This coverage hub is updated as new stories publish.

Fibre Channel Data Center Interconnects:

Scalability, availability, security and survivability of the data center resources, applications and data are paramount. All these are enhanced by the networked interconnection of data centers.

Optical Interconnect Technology Analysis: LPO, NPO, CPO

Exploring optical interconnects for AI data centers: LPO for low-power, short-distance links, NPO for high-density, near-package connections, and CPO for ultra-high-bandwidth co

Heat Wave Prompts Emergency Measures for Data Centers in Virginia

Proponents of alternative energy architectures, such as those described in "100% Renewable Energy Autonomy in Action," advocate for distributed co-generation to reduce reliance on

Vantage Data Centers Frontier: \$25B Texas AI Campus

Vantage unveils Frontier: a 1.4GW, \$25B Texas mega-campus with 250kW+ racks, liquid cooling, ERCOT PPAs, and 2026 delivery for AI workloads.

Why Data Centers Are Turning to Behind-the-Meter Power

Why Data Centers Are Turning to Behind-the-Meter Power Grid queues, community pressures, and AI demand push operators toward behind

What is Data Center Interconnect (DCI)?

Data Center Interconnect (DCI) technology connects two or more data centers together over short, medium, or long distances using high-speed packet-optical connectivity.

Smart Grid Market Report 2026: Key Insights | StartUs

Smart Grid 2026: market sizing context plus real adoption drivers - interconnection bottlenecks, resilience needs & digitalization.

The Colocation Services from Digital Realty Trust Inc.

Digital Realty Trust Inc. positions itself as one of the largest global data center REITs, combining traditional colocation with interconnection and cloud-adjacent services.

The Evolution of Data Center Interconnects

Longer data center interconnects enable a more decentralized system of data centers with branches in different geographical areas connected through high-speed optical fiber links to cope with the strain

Data centers eye solar for energy independence

Forget BYOD. Data centers are increasingly looking to BYOP – bring your own power – to avoid grid interconnection delays, and solar can help them do it. Solar has long been a part of the

Global HVDC Valves Market Size, Share & Industry Forecast 2026-2034

Global HVDC Valves Market Size By Type of Valve (Line Commutated Converter (LCC) Valves, Voltage Source Converter (VSC) Valves), By Application (Long-Distance Power

Clean Energy Resources to Meet Data Center

Near-term data center driven electricity demand growth is an opportunity to accelerate the build out of clean energy solutions, improve demand flexibility,

800G Optical Modules Explained: Standards, Types

Application scenario: 800G 2FR4 is suitable for data centers, 800G-800G, 800G-400G, 800G-100G interconnection; 800G 2xLR4 suitable for long

Data Center Interconnection Long-Haul DCI Deployment Guide for

Struggling with latency and scalability in cross-region data center interconnects? This operator-focused DCI guide delivers proven long-haul deployment strategies, cost-optimized

Data center interconnect

Modern data center interconnects rely heavily on optical fiber communication technologies to achieve high capacity and long-distance transmission. Single-mode fiber is commonly used due to its low

Data Centers in Space: Analyst Q& A on Commercial Feasibility and

Data centers in space are computing facilities deployed in orbit that process and store data using solar-powered infrastructure outside Earth's atmosphere. This Analyst Q& A reflects ABI Research's

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Building Prometheus: How Backend Aggregation

We're sharing details of the role backend aggregation (BAG) plays in building Meta's gigawatt-scale AI clusters like Prometheus. BAG allows us to

Successful demonstration of long-distance data center connections in ...

NTT and the NTT DATA, together with business units around the world, are planning joint demonstrations with customers in the financial sector and other use case areas for distributed data

Scaling large data center interconnects: Challenges and solutions ...

This paper discusses, from Google's perspective, emerging challenges and possible technical solutions for scaling intra-datacenter and intra-campus interconnection network bandwidth.

Data Center Interconnect | What is it? See Solutions from VIAVI

It refers to the technology used to link together two or more individual data centers to pool resources, balance employee workloads, replicate data, or implement disaster recovery plans – and provide

Contact Us

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