Cloud Data Center Interconnection Network



Overview

This white paper explains the need for multi-layer data center interconnection networks and how they need to support dynamic access to cloud applications and services.

Key Takeaways

A cloud data center interconnection network (DCI) is a high-speed, private network that links multiple data centers to operate as a unified, scalable, and resilient cloud infrastructure.

Definition and Purpose

A cloud data center interconnection network connects two or more geographically separated data centers using dedicated, high-capacity links, allowing them to function as a single, cohesive environment. This network enables data replication, workload migration, disaster recovery, and distributed applications across multiple sites while maintaining low latency, high bandwidth, and secure communication. Unlike public internet connections, DCI provides predictable performance and enhanced security because traffic flows over private circuits rather than shared networks.

Key Components and TechnologiesDCI networks use a variety of technologies to achieve high-speed, reliable connectivity: High-Bandwidth Links: Optical fiber connections, including dark fiber and wavelength services, support ultra-fast data transfer between sites.

© 2026 EXF OPTICAL NETWORKS - All rights reserved

Ethernet and MPL

S Circuits: Layer 2 and Layer 3 extensions allow seamless integration of applications and routing between data centers. Optical Wavelength Division Multiplexing (WDM): Divides optical signals into multiple channels to increase capacity, supporting speeds up to 400–800 Gbps. Path Optimization: Ensures efficient routing for VLANs and multi-tier applications across geographically distant sites.

Benefits

Operational Efficiency: Treats multiple data centers as a single infrastructure, simplifying management and resource allocation. Disaster Recovery and Business Continuity: Enables real-time replication and backup across sites, ensuring minimal downtime. Scalability: Supports growing workloads and cloud services by connecting additional data centers without performance degradation.

Security: Private circuits reduce exposure to internet-based attacks and provide inherent traffic isolation. Low Latency and High Reliability: Dedicated connections ensure consistent performance for applications requiring real-time synchronization.

Applications in Cloud Environments

Cloud providers and enterprises use DCI to: Connect hybrid cloud infrastructures across on-premises and public cloud data centers. Enable live workload migration and distributed applications across regions. Support edge computing by bringing data storage closer to users while maintaining centralized control.

Facilitate transcontinental or subsea connections for global cloud services. In summary, a cloud data center interconnection network is a critical backbone for modern cloud computing, providing secure, high-speed, and reliable connectivity that allows multiple data centers to operate as a unified, scalable, and resilient infrastructure.

Article Content

Data center interconnection for the cloud era

This white paper explains the need for multi-layer data center interconnection networks and how they need to support dynamic access to cloud applications and services.

Data center interconnection for the cloud era

Network automation is key to enabling more dynamic access to cloud applications and services by providing software-programmable IP/optical data center connectivity and interconnection that is

Data Center Interconnect: A Guide to DCI and Connectivity

© 2026 EXF OPTICAL NETWORKS - All rights reserved

Explore how data center interconnect works, and what to consider when connecting facilities, clouds, carriers, and network partners.

Data center interconnection for the cloud era

Tomorrow''s cloud infrastructure needs more integrated networks to provide data center interconnection that is more reliable, resilient and secure, and that reduces operating costs and improves efficiency

Why We Need a New Network Architecture to Connect Data Centers

Using cloud data centers with rich interconnection ecosystems provides several important benefits for enterprises, including improved security, reduced transport costs, higher

A Complete Guide to Data Center Network Architecture

As the name suggests, data center network architecture deals with the physical and logical arrangement of systems that interconnect servers, storage systems, and

Data Center Interconnect Solution Overview

The term DCI (Data Center Interconnect) is relevant in all scenarios where different levels of connectivity are required between two or more data center locations in order to provide flexibility for deploying

What is Data Center Interconnect (DCI)?

DCI technology sits at the center of the cloud-centric world, providing the network capacity for users and applications to connect to storage, compute, and content resources.

Data center interconnect

Recent developments in data center interconnect (DCI) are strongly driven by the rapid growth of artificial intelligence (AI), cloud computing, and global data traffic.

Understanding Interconnection in Colocation Data Centers

Explore key interconnection approaches in colocation data centers to boost connectivity, agility, and business performance with real-world examples.

Canada Data Centers, Colocation & AI-Ready Infrastructure

Colocation and cloud interconnection in AI-ready Canada data centers Equinix''s Canada data centers support the nation''s digital economy with AI-ready infrastructure across Toronto, Montreal, Calgary,

10 Biggest Data Center Locations in the U.S. in 2026

© 2026 EXF OPTICAL NETWORKS - All rights reserved

A data center market refers to a region with multiple large-scale data center campuses. These offer substantial infrastructure, such as power, network

Netrality Data Centers

Explore Netrality Data Centers for premiere interconnection and colocation. Enhance your digital strategy and connect where it counts. Learn more & tour

Sydney Cloud & Datacenter Convention 2026, Sydney, Australia

Conference Description Key Takeaways Two-day convention addressing data centre, cloud, AI infrastructure, and network connectivity challenges across Australia and Asia-Pacific Three

Netrality Data Centers Announces Bridged Broadband Network Hub ...

Netrality Data Centers, the largest privately-held owner and operator of core interconnection facilities in the U.S., announced today the deployment of Bridged Broadband''s core

Data Center Solutions and Facilities | Flexential

Improve network performance and interconnection Improve network response time, high-density distributed workloads, and user experience. Handle compute-heavy AI and machine learning

Data Center Colocation | Hyperscale Edge

We operate 45+ data centers across 13 strategic edge North American markets. Our data center ecosystem includes prime colocation and interconnection hubs and

Equinix Global Digital Infrastructure Company Providing Data Centers ...

Download Equinix Global Digital Infrastructure Company Providing Data Centers, Cloud Connectivity, Network Interconnection, AI Infrastructure, and Enterprise Technology Solutions Stock Photo and

Related Video Reference

This video was associated with the source search result. Verify technical details against current product documentation and project requirements.

© 2026 EXF OPTICAL NETWORKS - All rights reserved

Contact Us

Continue your research online:

Website: https://explosivefunctions.co.za
Technical inquiry: https://explosivefunctions.co.za/contact.html
EU project coordination: Parque das Nações, Lisbon, Portugal

This document is for preliminary research. Verify specifications against current standards, product documentation and project requirements.

© 2026 EXF OPTICAL NETWORKS - All rights reserved