Intelligent technical parameters for cold aisle in supercomputing centers



Overview

Starting from the system architecture, this paper will elaborate on the technical parameters, functional advantages, and application value of the core components of the cold aisle containment system, providing technical reference for data center construction . Starting from the system architecture, this paper will elaborate on the technical parameters, functional advantages, and application value of the core components of the cold aisle containment system, providing technical reference for data center construction . Starting from the system architecture, this paper will elaborate on the technical parameters, functional advantages, and application value of the core components of the cold aisle containment system, providing technical reference for data center construction, operation and maintenance, and. ing effectiveness, and improve overall operational performance. Below are some key takeaways, rationale, and requirements for im date the evolving needs & configurations of colocation le containment is a crucial strategy in data center management. It involves the use of physical barriers or. This methodology focuses on the absolute separation of cold supply air and hot exhaust air to mitigate the systemic risk of air mixing, which frequently compromises thermal efficiency. Two fundamental approaches serve as international industry standards: Hot Aisle Containment (HAC): This. Data centers are power- and cooling-intensive facilities where even minor inefficiencies can translate into significant energy and operational costs. Without proper airflow management, mixing of cold and hot air can occur.

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Article Content

Numerical and experimental investigations on thermal management

This study presents a container data center via the cold aisle containment design combining with a HX on the airside and a EWC on the waterside as an effective solution to enhance

Detailed Explanation of Technical Architecture and Core Components

The entire system is mainly composed of four core modules: cabinet system, power distribution system, aisle containment system, and power and environment monitoring system. All

AI-driven cooling technologies for high-performance data centres:

As heat dissipation from AI workloads grows less predictable, airflow management strategies (i.e., hot/cold aisle containment and dynamic control) are increasingly explored to address

A DEEP DIVE INTO THE WORLD OF HOT & COLD AISLE

THE GREEN GRID: ASHRAE Data Center Cooling Guidelines: Developed in collaboration with ASHRAE, this document provides best practices for data center cooling, including hot and cold aisle

Hot & Cold Aisle Containment: Implementation Guide 2026

Learn how to implement hot and cold aisle containment in existing data centers — HAC vs CAC comparison, PUE optimization, compliance standards, and cost analysis.

Optimizing Thermal Performance in Data Centers: A ...

With rising IT loads and increasing demand for sustainability, containment strategies such as Hot Aisle Containment (HAC) and Cold Aisle Containment (CAC) have become pivotal in thermal...

Cold & Hot Aisle Containment For Data Center Efficiency

Learn how cold and hot aisle containment improves airflow, reduces energy use, and boosts reliability in data centers. Backed by CFD insights from EXPERIQS.

(PDF) Numerical Investigation of Thermal Performance with Adaptive ...

In this paper, a new type of air supply terminal device is proposed, and it could adaptively adjust according to the power of servers in the rack for cold air redistribution. In addition, the...

COMBINING COLD AISLE CONTAINMENT WITH INTELLIGENT CONTROL

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Vertiv recommends a comprehensive efficiency management platform that combines cold aisle containment technology with intelligent environmental controls to deliver greater than 30 percent

AISLE CONTAINMENT

Aisle containment in the data center requires that cabinets are aligned in a hot aisle/cold aisle layout. Containment panels or strips create a partition to isolate either the server supply air (cold aisle

On cold-aisle containment of a container datacenter

Abstract In this study, influences of various blockage arrangements as well as cold-aisle containment on the overall efficiency of a container datacenter are reported. The test container

Impact of Hot and Cold Aisle Containment on Data Center

It also concludes that new data center designs should use or provision for hot-aisle containment. The containment of hot or cold air in a data center results in the following efficiency benefits.

AI-driven cooling technologies for high-performance data centres:

Although hot and cold aisle containment (CAC) strategies have helped improve cooling efficiency, they remain insufficient for the thermal demands of modern AI models and high

Cooling Technologies for Internet Data Center in China ...

The highlighted energy consumption of Internet data center (IDC) in China has become a pressing issue with the implementation of the Chinese dual carbon strategic goal. This paper

Optimization Control Strategies and Evaluation Metrics

In the age of digitalization and big data, cooling systems in data centers are vital for maintaining equipment efficiency and environmental

Energy Savings Through Hot and Cold Aisle Containment Configurations ...

Cold aisle containment is used in raised floor, air cooled data centers to minimize direct mixing between the supplied cold air and the hot air exiting from the servers.

Detailed Explanation of Technical Architecture and Core

Starting from the system architecture, this paper will elaborate on the technical parameters, functional advantages, and application value of the core

Hot-Aisle vs. Cold-Aisle Containment for Data Centers Revision 1

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With cold-aisle containment, the general working area (walkways, workstations, etc.) becomes the hot aisle as shown in Figure 6. With hot-aisle containment, the general working area of the data center

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