

The construction project of the cold aisle computer room includes



Overview

Hot aisle/cold aisle configuration is a best practice solution that separates hot and cold air streams.

Key Takeaways

Cold aisle construction involves arranging server racks back-to-back, enclosing the aisle, and directing cool air to the front of servers to optimize cooling efficiency and reduce energy consumption. Rack Arrangement and Aisle Layout

Cold aisles are formed by placing server cabinets face-to-face, with the fronts of the servers facing the aisle where cold air is supplied. The hot aisles are located at the rear of the racks, where heated exhaust air is expelled. Standard cabinet dimensions often include a width of 800mm (600mm equipment space plus 200mm side space) and a depth of 1150mm, allowing for cable management and airflow optimization .

Containment Structures

To prevent mixing of cold and hot air, physical barriers are installed around the cold aisle. These typically include:

- Ceilings or roofs over the aisle
- Doors at both ends of the aisle



- Gap in-fill panels along the sides These structures ensure that cold air is delivered directly to the server intakes, improving cooling efficiency and reducing hotspots . Galvanized iron sheets or similar materials can be added above the aisle to prevent return air from re-entering the cold aisle .

Airflow Management

Cold aisle containment works in tandem with raised floor systems or other precision cooling setups. Perforated floor tiles or vents supply cold air from CRAC (Computer Room Air Conditioning) units directly into the aisle. The hot air from the rear of the racks is returned to the cooling units via return air ducts or ceiling plenums, maintaining a balanced airflow . Proper sizing of return ducts ensures uniform suction and prevents temperature gradients .

Integration with Electrical and Cabling Systems

Side cabinets or dedicated cable channels allow for pre-installed network and power cables, keeping them out of the airflow path and maintaining aesthetics. Horizontal and vertical cable bridges can connect racks to external corridors without obstructing airflow .

Benefits and Efficiency

Cold aisle containment can:

- Reduce energy consumption by up to 30-40%
- Improve cooling performance and server reliability
- Be retrofitted into existing data centers with minimal structural changes
- Shorten payback periods due to energy savings

Best Practices

- Maintain a hot aisle/cold aisle configuration consistently across the room
 - Use blanking panels to fill empty rack spaces and prevent air recirculation
 - Monitor temperature and humidity with sensors to ensure optimal conditions
 - Ensure that lighting, fire suppression, and other systems are compatible with containment structures
- By following these guidelines, a cold aisle can be effectively constructed to maximize cooling efficiency, reduce operational costs, and extend the lifespan of IT equipment.

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Hot Aisle Containment vs. Cold Aisle Containment:

Implementation of both hot and cold aisle containment does not reduce the volumetric flow

Hot and Cold Aisle Containment Systems: How They Work and Why

Hot aisle containment (HAC) and cold aisle containment (CAC) are the most efficient ways of preventing your servers

Data Center Aisle Containment Systems | Profile IT Solutions

Explore 30 hot aisle, cold aisle, structural, door, roof, flexible containment and airflow-control products for data centers. Engineering

The cold aisle containment advantage

HP partnered with Rittal Corporation and Liebert Corporation to establish a test environment for measuring and validating the

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The cost of this cold and hot aisle isolation is very low, and the processing methods of the lighting system and the gas fire protection

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Core Design Principles for Cold-Aisle Containment A compliant and efficient CAC system integrates five interdependent elements:

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Complete cold aisle containment guide for data centers. Learn CAC benefits, implementation steps, and achieve 35% cooling cost

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Cold Aisle Containment: The Best Option?

Cold Aisle Containment, also referred to as CAC, is a system that isolates a cooled air supply from Computer Room

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