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WHITE PAPER

DATA CENTER

A DEEP DIVE INTO THE WORLD OF

HOT & COLD AISLE CONTAINMENT ZONE

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WHITE PAPER

INDUSTRY STANDARDS, GUIDELINES, AND BEST PRACTICES

ASHRAE (AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS):

ASHRAE TC 9.9 Datacom Series:

Provides guidelines for environmental conditions in data centers, including temperature and humidity ranges.

ASHRAE Standard 90.4:

Focuses on energy efficiency in data centers, providing guidance on cooling and airflow management.

THE UPTIME INSTITUTE:

Tier Standard:

Uptime Institute's Tier Classification System includes guidelines for data center design and infrastructure, including considerations for

Site Uptime Network Guidelines:

Offers guidance on airflow management strategies & containment best practices.

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 containment.

BICSI (BUILDING INDUSTRY CONSULTING SERVICE INTERNATIONAL):

BICSI 002 Data Center Design and Implementation Best Practices:

Provides comprehensive guidelines for the design & implementation of data centers, including considerations for airflow management and containment.

ISO/IEC STANDARDS:

ISO/IEC 30134-1:

Focuses on data center key performance indicators, including guidelines for energy efficiency and environmental monitoring.

ISO/IEC 27001:

Provides a framework for information security management, which is essential for co-location data centers.

NFPA (NATIONAL FIRE PROTECTION ASSOCIATION):

NFPA 75:

Offers guidelines for the protection of information technology equipment.

EPA ENERGY STAR FOR DATA CENTERS:

EPA ENERGY STAR for Data Centers:

Mandated by the U.S. Federal Government, DCOI outlines guidelines for federal data centers to optimize efficiency, including considerations for containment.

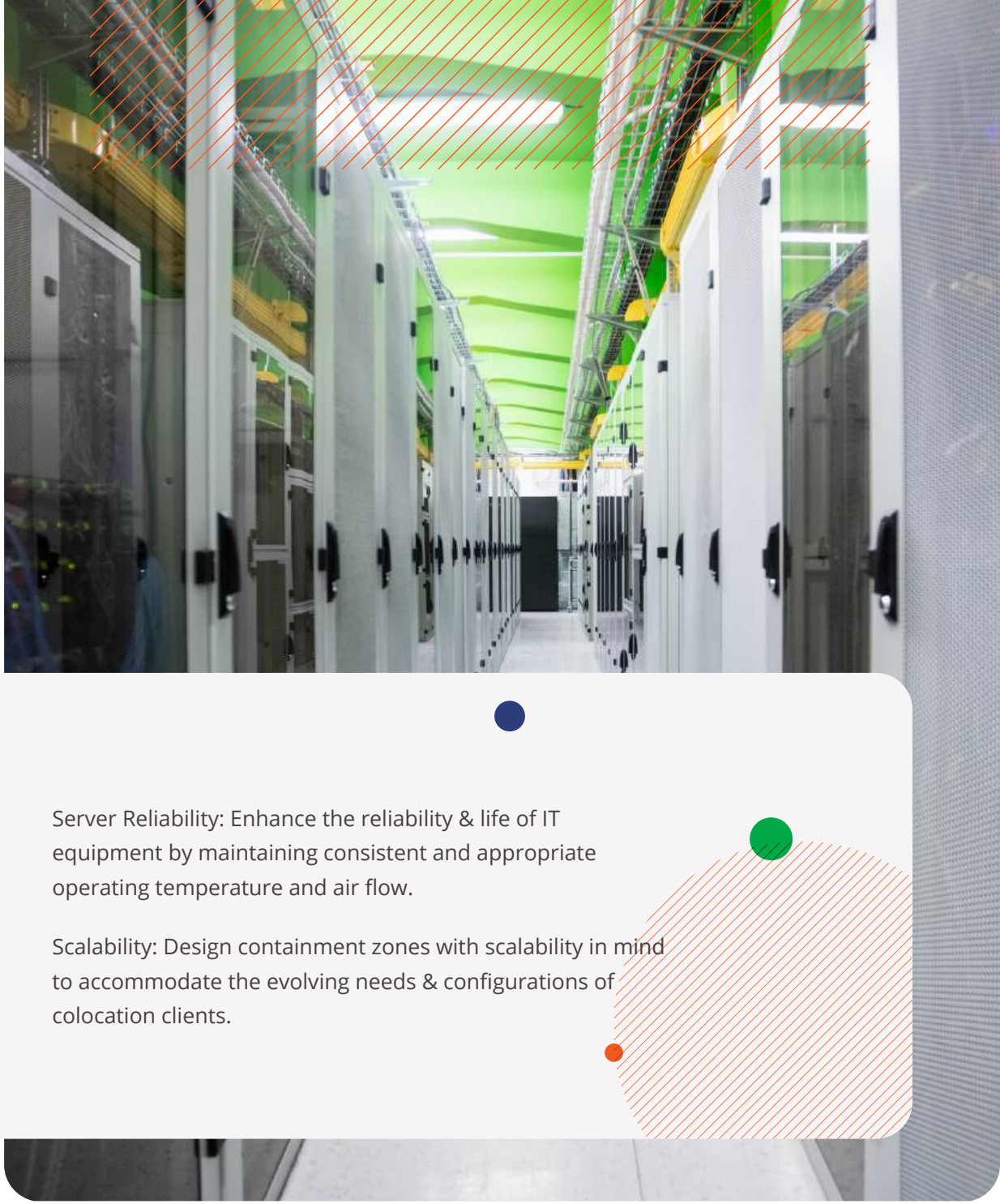
EUROPEAN CODE OF CONDUCT FOR DATA CENTRES:

Site Uptime Network Guidelines:

Provides voluntary best practices and guidelines for data center operators in Europe, covering various aspects, including energy efficiency and cooling.

NEED FOR HOT AND COLD CONTAINMENT ZONES IN A COLO DATA CENTER.

In the dynamic landscape of co location data centers, the implementation of hot and cold containment zones is a critical strategy to optimize energy efficiency, enhance cooling effectiveness, and improve overall operational performance. Below are some key takeaways, rationale, and requirements for implementing hot and cold aisle containment within a data center.



OBJECTIVES OF DATA CENTER HOT & COLD AISLE CONTAINMENT ZONE

Energy Efficiency: Minimize energy consumption by creating distinct hot and cold zones, allowing for precise control of temperature and airflow.

Optimized Cooling: Improve the efficiency of cooling systems by directing airflow where it is needed, ensuring IT equipment operates within optimal temperature ranges.

Server Reliability: Enhance the reliability & life of IT equipment by maintaining consistent and appropriate operating temperature and air flow.

Scalability: Design containment zones with scalability in mind to accommodate the evolving needs & configurations of colocation clients.

KEY COMPONENTS OF HOT AND COLD AISLE CONTAINMENT ZONES.

AISLE CONTAINMENT

Aisle containment is a crucial strategy in data center management. It involves the use of physical barriers or enclosures at the end of server aisles to separate hot and cold airflows. This separation is vital for maintaining optimal temperatures and ensuring the efficient operation of servers. To maintain the integrity of the containment, blanking sheets & plates, wire brushes, and grommets are used along with the end barriers.

RAISED FLOOR SYSTEMS

Another effective strategy is the implementation of raised floor systems. These systems, coupled with suitable perforated tiles, allow for the efficient distribution of cold air to the server racks. By directing the cold air precisely where it's needed, raised floor systems help to reduce energy consumption and improve the overall efficiency of the data center.

CEILING PANELS & DUCTS

The installation of false ceiling panels and ducts is another important aspect of data center management. These installations facilitate the removal of hot air generated by IT equipment. The hot air is then directed to PAHU/CRAC/FW units, which helps to maintain a stable and suitable environment for the servers.

TEMPERATURE & HUMIDITY SENSORS

Lastly, the deployment of temperature and humidity sensors throughout the data center is essential. These sensors monitor the environmental conditions continuously, ensuring they remain within specified parameters. This constant monitoring allows for immediate response to any changes, thereby preventing potential damage to the servers and other IT equipment.

> Best strategy is to plan for containment during design stage to avoid working in a live data center at a later stage.
>
> **- Mahesh Trivedi, Strategic Advisor to OCS Group India, Data Centers**

HOT & COLD AISLE CONTAINMENT ZONE IMPLEMENTATION STRATEGY.

Effective data center management begins with Assessment and Planning. This involves conducting a thorough cooling assessment of the current data center and developing a comprehensive plan for the implementation of hot and cold containment zones.

The next step is Gradual Implementation. Containment zones should be implemented in a phased approach to minimize disruptions to ongoing operations and client services.

It's also crucial to have Stakeholder Collaboration. Engaging with stakeholders to understand their specific requirements ensures that containment strategies align with their equipment configurations.

Lastly, Staff Training is essential. Data center personnel should be trained on the proper management and maintenance of containment systems to maximize their effectiveness. These steps, when executed properly, can significantly enhance the efficiency and longevity of a data center.

OPERATIONAL ASPECTS OF HOT AND COLD AISLE CONTAINMENT ZONES

Airflow Management: Utilize perforated tiles, grates, or directional vents to guide cold air to the server inlets and direct hot air away from the equipment.

Adjustable Rack Configurations: Design server racks that allow for easy adjustment of cold and hot aisles to accommodate different client setups.

Automation and Control Systems: Implement automated control systems that adjust cooling parameters based on real-time data, ensuring optimal conditions at all times.

Energy-Efficient Cooling Systems: Deploy precision cooling systems with variable fan speeds and intelligent controls to match the cooling output with actual demand.

CONCLUSION.

The implementation of hot and cold containment zones in a co location data center is a strategic investment in energy efficiency, reliability, and client satisfaction. This aligns with industry best practices and positions the data center as operationally reliable and efficient in a rapidly evolving Data Center technology landscape.

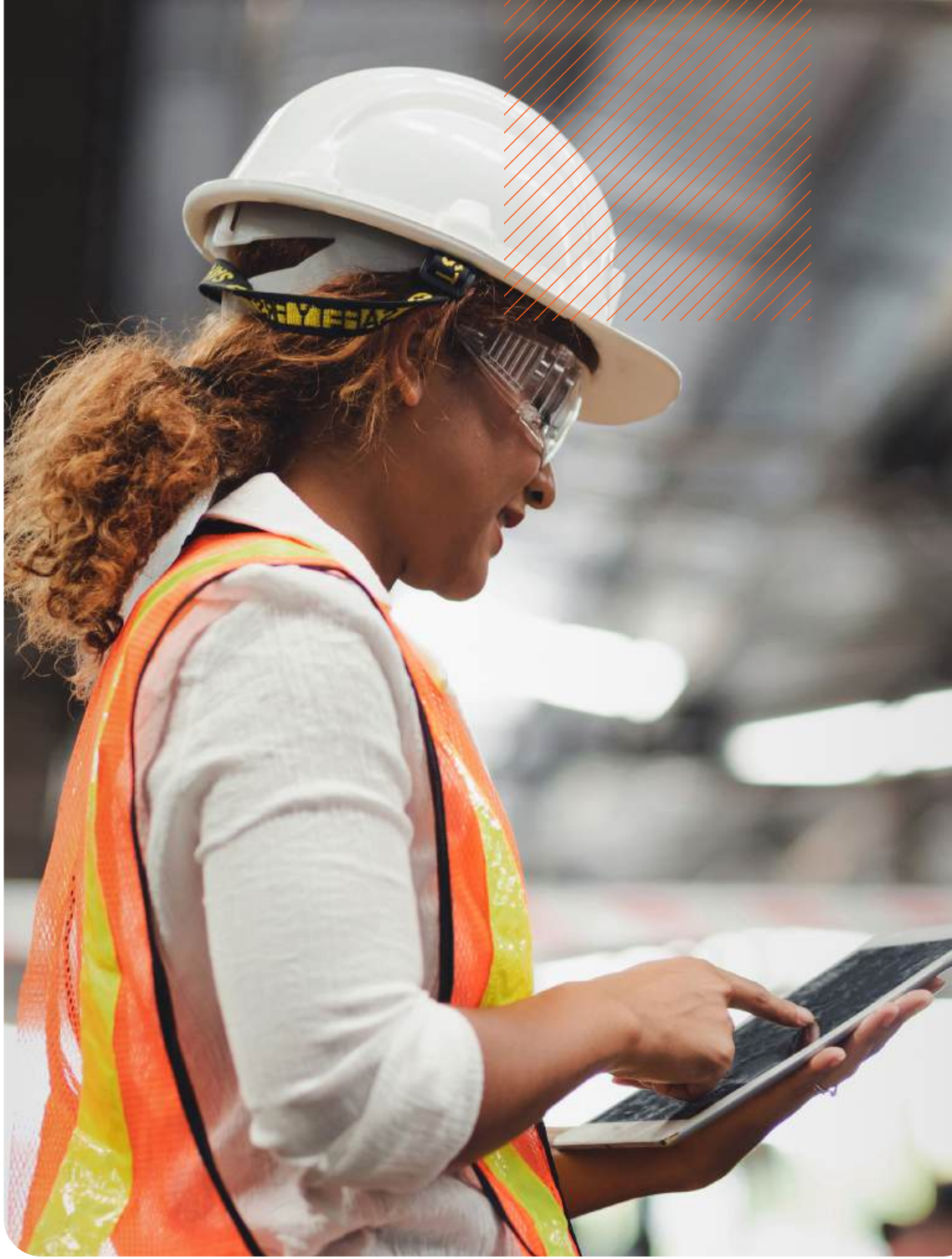
BENEFITS OF DATA CENTER HOT & COLD AISLE CONTAINMENT ZONE.

Energy Cost Reduction: Lower energy consumption and operational costs through targeted cooling strategies.

Improved Equipment Performance: Enhance the performance and reliability of IT equipment by maintaining optimal operating temperatures.

Client Satisfaction: Offer colocation clients an environment that ensures the efficient and reliable operation of their equipment, leading to increased satisfaction.

Sustainability: Contribute to environmental sustainability by minimizing the carbon footprint associated with data center operations.



Mahesh Trivedi, Strategic Advisor to OCS Group India, Data Centers.

Mahesh is a veteran with an extensive career spanning over three decades. He is a visionary who brings a wealth of experience to the data center industry. He has consistently maintained a remarkable record of near 100% uptime across all managed Data Center's.

Mahesh played a pivotal role in the conceptualisation, design, and construction of key data centers across India. Over the last decade he has advised leading Data Center players in the design, operation, and planning of mission critical facilities.

For further enquiries on Data Center Hot & Cold Aisle Containment Zone,, please contact **Anoop Sharma** at **expertcare@ocs.com**

We offer a complimentary survey and report for Data Center Hot & Cold Aisle Containment Zones. Connect with us.

About

OCS

OCS Group is a **£2 Bn**. company employing more than **130,000 colleagues** in **27 countries.**

We are the world's leading facilities service provider, delivering critical and essential services to support our **20,000+ customers**.

In India we have **14 branches** and **13,000 colleagues** who service **1200+ sites across India.** Our vision and mission is to become the best facilities service business in the world, making people and places the best they can be.

Through our strategic partnerships, we offer **IOT solutions, IP security and surveillance solutions, energy management, electrical safety and risk mitigation solutions.**

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