Analysis Drives Integrated Containment Solutions

Product:
Cold Aisle Containment with Paramount Enclosure System

Location:
Tampa, FL

Market Served:
Healthcare

"The cold aisle containment solution was a huge "ROI success" saving BayCare Health System thousands of dollars annually on our data center's electric bills"

Mike Jones, Data Center Manager
BayCare Health System

Background

BayCare Health System is a leading community-based health system in the Tampa Bay area. Composed of a network of 10 not-for-profit hospitals, outpatient facilities and services such as imaging, lab, behavioral health and home health care, BayCare provides expert medical care throughout a patient's lifetime. With more than 195 access points conveniently located throughout Tampa Bay, BayCare connects patients to a complete range of preventive, diagnostic and treatment services for any health care need BayCare's family of hospitals are: Mease Countryside, Mease Dunedin, Morton Plant, Morton Plant North Bay, St. Anthony's, St. Joseph's, St. Joseph's Children's, St. Joseph's Hospital-North, St. Joseph's Women's, and South Florida Baptist.

Challenges

BayCare Health System's data center was constructed in June of 2007, utilizing standard hot/cold aisles implemented in legacy data centers. While utilizing this configuration and implementing a consistent blanking panel strategy in the empty U spaces, BayCare's temperature sensors still indicated a difference of as much as 22° from the air coming out of the raised floor, versus the air reaching the servers at the top of its enclosures. The problem was that the air from the hot aisles was wrapping around to the cold aisle and also bleeding over the tops of Baycare's server pods. Thus, BayCare set out to implement energy saving techniques that would adequately cool its systems while providing a reasonable return on investment. BayCare is keenly interested in keeping its data center aesthetically pleasing and therefore decided to investigate Eaton's Cold Aisle Containment System – a natural fit and perfect match to its 100 Eaton enclosures.

Solutions

Eaton's team performed an in-depth onsite analysis of BayCare's aisle containment system. Thermal images were taken that showed the hottest spots located behind the racks. Computational Fluid Dynamics (CFD) models and airflow simulations were also conducted and the results showed that, although BayCare was implementing some best practices by using blanking panels and the hot/cold aisle configuration, it was not supplying enough air through the handful of perforated tiles installed in the raised floor. Furthermore, not all of the cold supply air was reaching the top of each enclosure and the air was leaking through various openings in and around the rear of the enclosures. Thermal images also verified that hot air was wrapping around the hot aisles and making its way back to the cold aisles. Using the test results, the Cold Aisle Containment System was recommended to alleviate the chaotic cooling issues. Upon installation of more perforated floor tiles as well as Eaton's Cold Aisle Containment System – consisting of clear aisle ceilings and End-of-Row Doors to enclose the server pods – it was determined that the temperature from the floor to the top of the racks was practically the same – within 1° from bottom to top. It's also important to note that additional rack-hygiene best practices including foam seal kits to fill all air leakage fault areas were implemented at the rack level.

F·T·N

Powering Business Worldwide

Implementation

BayCare's 8600 square foot data center is divided into three dedicated regions and the Cold Aisle Containment System was initially only installed in one region. The region uses 80 Eaton Wright Line enclosures with Class 1 EIA-310 rack mounted server equipment. The Aisle Containment Ceiling, comprised of V-0 rated Lexan® panels, mounts to the top of the enclosures. The ceiling's self-supporting structure allows for easy rack changes within the row and holes can be strategically drilled in the panels to further accommodate any type of fire suppression system. End-of-row doors were then installed at either end of the aisles blocking an obvious cold air escape route and entry for hot air re-circulation and air mixing. Containing the cold aisles allowed BayCare to set a higher overall temperature within the data center.

Results

CFD models and airflow simulations done after the cold aisle containment system was implemented confirmed the changes were a huge success and more thermal images further validated the data. Additionally, containing the cold air in front of the systems enabled BayCare to raise its Computer Room Air conditioning (CRAC) set points four degrees higher from 70 to 74.

Today, BayCare has installed the Cold Aisle Containment Solution on all of its server pods. With the help of CFD simulation modeling, the Cold Aisle Containment recommendations have provided BayCare with more consistent inlet temperatures and increased energy savings in its data center. "The cold aisle containment solution was a huge "ROI success" saving BayCare Health System thousands of dollars annually on our data center's electric bills", commented Mike Jones, Data Center Manager at BayCare Health System.

End of Row Doors

Eaton's Wright Line End of Row doors create more efficient cold aisles by blocking an obvious cold-air escape route and entry for hot air re-circulation and air mixing.
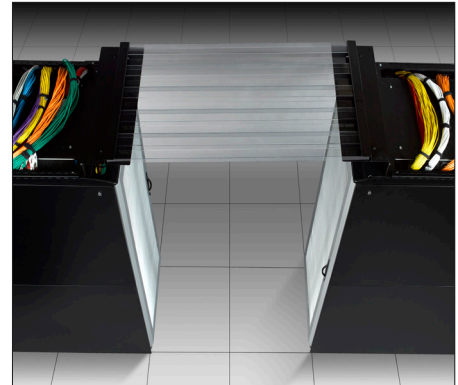
Aisle Containment Ceiling

Comprised of V-0 rated Lexan® panels, the Aisle Containment Ceiling adds limitless flexibility to rack heights, row spacing and fire suppression.

FAT•N

Powering Business Worldwide