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Fire marshal requirements prove to be biggest hurdle for updating legacy data center

Background

A major private research university wanted to improve energy efficiency in its legacy data center by upgrading everything from air conditioning and power systems to airflow balance and cold aisle containment. The high-density data center covering more than 10,000-square-feet sat on a raised floor and had a complex overhead fire suppression system. The university had its own fire marshal whose strict requirements turned out to be one of the project's biggest challenges.

Goals

The university set out to save power costs and improve cooling with a two-year energy efficiency project. Once the project began, it became clear that working around the legacy data center's physical structure for the cold aisle containment system would be a major challenge. It wasn't until the project was underway that the data center discovered the fire marshal would not let them install containment panes to the ceiling because of overhead fire sprinklers. Any solution would have to allow access to the fire suppression system and smoke detectors in the cold aisles.

Solution

The fire marshal insisted that the fire suppression and detection system not be moved or modified in any way, so Instor custom designed the hard containment around the functions of the fire systems. In cold aisles, we built containment pods without roofs to allow access to the fire suppression system and smoke detectors. On end aisles, the sides of the contained pods implemented sliding Electrorack doors to contain cold air.

All custom polycarbonate panels, normally cloudy in appearance, were designed to be clear so that anyone inside the pod could clearly view exit signs from within. Existing rows were offset, so Instor custom designed several polycarbonate walls and gap panels to accommodate older bulky equipment. We also provided 166 fire-resistant floor seal pillows of varying sizes (4"x4", 6"x6", 9"x9", 12"x12") and placed them in holes in the raised floor tiles to improve static pressure below.

Through our upgrades, the university significantly improved PUE and received more than $300,000 in rebates from utility provider PG&E. According to some industry estimates, data center managers can save 4 percent in energy costs for every degree of upward change in the set point on air conditioners. The university was able to raise set points 6 degrees, for continued energy savings of roughly 24 percent each month.

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