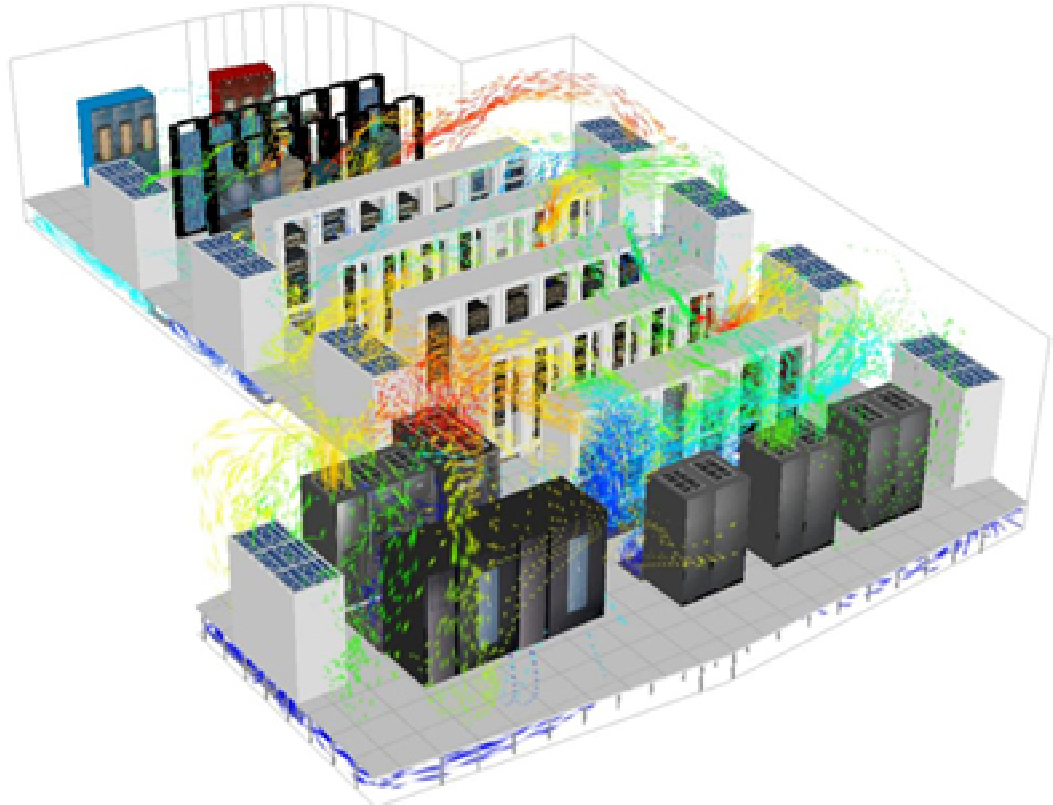
Cisco Saves $120,000-Year by Improving Exhaust Recirculation in Data Center

Cisco Systems achieved an estimated saving of $120,000 per year in energy costs by simulating a data center using Future Facilities' Virtual Facility (VF) simulation methodology. The simulation results were used to guide the placement of floor grilles and blanking panels that lowered information technology (IT) equipment inlet temperatures, making it possible to raise the chilled water setpoint by 8ºF. "The Virtual Facility is the best tool I've seen to tie together cooling, availability and efficiency in one analytic model," said Rob Aldrich, Cisco Principal, Energy Efficiency.



A data center on Cisco's San Jose campus occupies 7,000 square feet and is filled with 3202 units of IT equipment, drawing 770 kW. There is 1 MW of total power available and 820 kW of cooling capacity. The total energy bill for the facility was originally $1.4 million per year, including $660,000 per year in cooling energy costs and $707,000 per year in IT equipment energy costs. The facility has been in operation since 1999 with limited considerations for efficient operations.

A team led by Chris Noland, Engineering Manager for Cisco, employed two techniques in parallel to improve energy efficiency. This first was a familiar set of best practices that include blanking panels and plastic curtains to prevent mixing of supply and return air. Note was taken by Noland's team of two major limitations of best practices. Firstly, best practices offer no foresight of outcome and Noland wanted a return on investment estimate in advance to justify the required expenditure. Secondly, best practices are designed to address room-level efficiency issues. In most data centers, efficiency problems are more likely to be caused by thermal incompatibilities between IT equipment and cabinets than they are by flawed room designs.

The second technique used was the VF simulation-based approach. The VF is a detailed, 3D model that can simulate the space, power and cooling behavior of the actual facility, including the thermal interactions between the room infrastructure, cooling system, cabinets and individual units of IT equipment. Throughout the life cycle, from initial design, construction, commissioning, to day-to-day operations, the VF can replace inadequate rules-of-thumb with scientific precision to manage resilience and efficiency of the mission critical facility.

The VF analysis showed clearly that exhaust recirculation within cabinets was the pressing problem, which was causing high IT equipment inlet temperatures and the need to overcool the chilled water system. Noland found that blanking and containment curtains actually increased inlet temperatures for many units of equipment in Lab 7D. The VF was used to guide the tactical placement of floor grilles and blanking panels that eliminated the worst of the cabinet and room-level hot spots.

The resulting 8ºF increase in chilled water set point provided a 30% reduction in power required for cooling and $120,000 per year in energy cost savings. There was no decrease in equipment resilience as determined by inlet air temperature. Based on the success of this application, Cisco Systems has adopted the VF approach to maximize resilience and efficiency over time.

For more information, visit www.futurefacilities.com [1] or contact Sherman Ikemoto, General Manager, Future Facilities Inc., Ph: 408-436-7701 or 408-497-3671, email: sherman.ikemoto@futurefacilities.com.

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