

## Performance matters

### This month's topic: Manage airflow to reduce hotspots

Hot spots are locations at the intake of IT equipment where the measured temperature is greater than the expected value according to ASHRAE thermal guidelines. The problem can be exacerbated by high-density server racks of 6 kW to 8 kW and higher, versus 2 kW per rack just a few years ago. Modern racks can generate 10 or more times the amount of heat per square foot.

One industry study estimates that at least 10 percent of data centers have trouble with hot spots, and many are dealing with the problem in ineffective ways. For example, lowering the cooling system set point only reduces overall energy efficiency, and is not an option if the CRAC/CRAH is already operating at 100 percent load. Portable cooling units and additional perforated tiles do nothing to solve the problem at its source.

Here are four strategies that combat hot spots at the root causes – bypass and recirculation:

#### Reduce airflow leakage

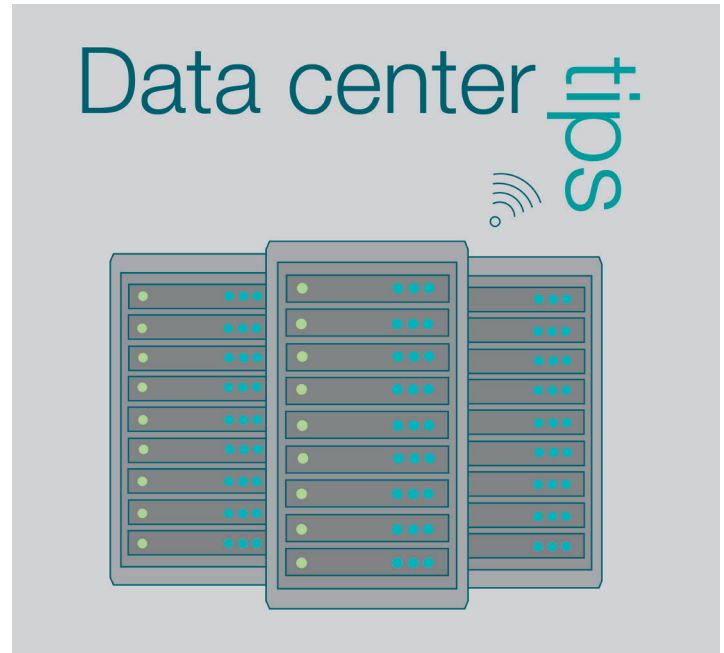
Use blanking panels to fill open rack U-spaces, and brush strips at cable penetration points. Put a policy in place to ensure that these measures are maintained when racks are repositioned or new servers are installed.

#### Evaluate side-to-side airflow needs

If your data center uses switches and routers that require side-to-side airflow, you can install side-air distribution units to eliminate hot spots. This prevents hot exhaust air from the switch or router from returning to the intake, which occurs when only front-to-back airflow is utilized.

#### Separate hot and cold air streams

Hot spots also occur when hot and cold air streams meet around the outside of a rack. Containment solutions for existing data centers are identified through a facility analysis of ceiling heights and other constraints; this determines the most practical approach, such as ducted hot air or rack containment. For new data center construction, hot-aisle containment is a popular way to maintain uniformity between the supply air temperatures at the cooling unit and the IT inlet.



#### DCIM technology

DCIM systems use real-time monitoring and analytics to proactively adjust for potential hot spots and other inefficiencies before they become a serious problem. A DCIM solution such as ABB's Decathlon® can detect potential hot spots using sensors that protect IT assets, while dynamically adjusting fan speeds and cooling system settings for power optimization.

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