

AdvancedTCA Airflow Management Solution

Data and communications network equipment mounted in open-frame racks with side-to-side airflow is incompatible with today's data center needs. Front-to-back airflow cooling is preferred in order to accommodate the hot aisle / cold aisle airflow patterns predominant in modern data centers. Data centers that use side-to-side cooling systems placed in dense bayed rows of racks with insufficient air barriers can experience excessive temperatures and degraded system reliability. UNICOM Engineering offers a unique and effective airflow rerouting solution to this problem.

Case Use

On behalf of a leading communications equipment provider, UNICOM Engineering created a method to deliver side-to-side cooling inside the frame and accommodate the front-to-back airflow pattern needed for data center compatibility. The system involves a series of air ducts that effectively redirect intake air from the front of the unit to its sides and through the equipment designed for side-to-side airflow (Figure 1).

Air baffles then direct the heated air for exhaust out the rear. This delivers the proper cooling patterns needed to integrate side-to-side airflow equipment with other rack enclosures using front-to-back airflow, as well as compliance with the EIA-310D standard.

This particular UNICOM Engineering solution employs a 5U ATCA subsystem made by Radisys (SYS-6006), which requires side-to-side cooling, and these other components to complete a fully integrated UNICOM Engineering rack solution.

- Schroff 44Ux600x1000 Seismic Tecnorack
- DC Power Subsystem
- Fiber Switch Subsystem
- Terminal Server Subsystem
- 13U ATCA Subsystem
- Storage Subsystem



Figure 1: Using a series of air baffles, cool air is drawn in from the front of the rack and redirected to the equipment intake on the side of the unit, then exhausted to the rear of a rack.

To ensure that this cooling method is effective, UNICOM Engineering and Radisys studied temperature measurements taken of the system under load conditions. By directing the hot exhaust air into the hot aisle, cold and hot airflows are better segregated, resulting in higher system efficiency and reliability. Data centers are now able to integrate and/or retrofit side-cooled systems with existing rack equipment to simplify floor planning and system cooling interdependencies.

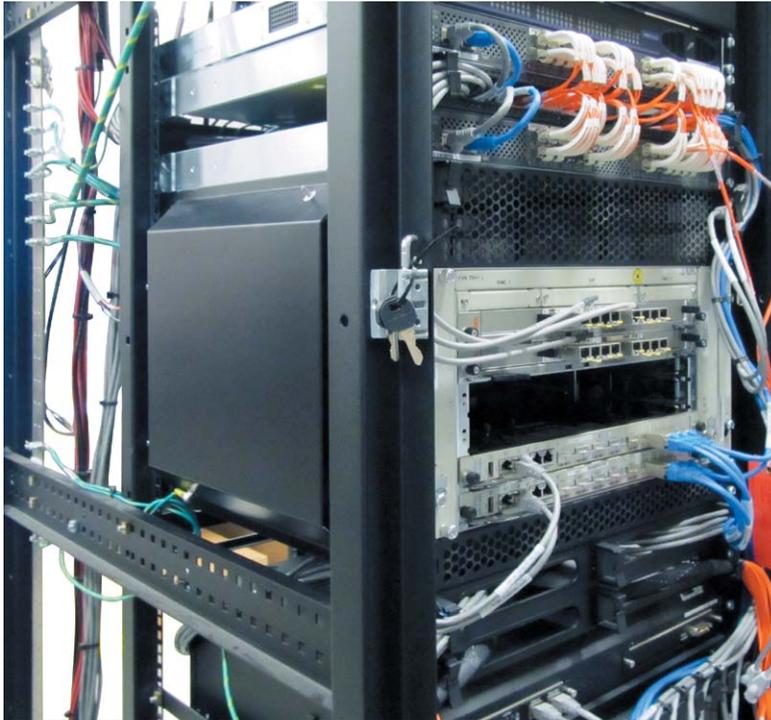


Figure 2:

This is an example of a populated rack with the air baffle installed.

Features and Benefits

- Baffles inside the enclosed rack effectively redirect airflow for front-to-back cooling
- Internal side air distribution provides higher rack power densities and improved cooling efficiency
- Redirected side air distribution facilitates the convergence of data and voice networks into a common hot aisle / cold aisle environment.

Conclusion

The cooling of rack equipment with side-to-side airflow requires careful planning to avoid overheating conditions, particularly when used in front-to-back airflow data center environments. Using UNICOM Engineering's proven method, it is possible to effectively cool rack enclosures containing equipment with side-to-side airflow.

This method involves drawing air in from the front

of a rack, redirecting it to the equipment intake on the side of the unit, and exhausting it to the rear of a rack. The system maintains safe temperature levels and maximizes cooling system efficiency. Converting side-to-side airflow into front-to-back airflow in this manner allows seamless integration into high-density data center rack cooling systems using the widely accepted hot aisle / cold aisle design.

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