

mechanical

Mechanical Overview

ADC runs off central services (Mechanical and Electrical) which allows for very efficient cooling. With our core design and efficient approach, ADC is ensuring all cooling options are available if required giving all customers the most efficient options when it comes down to individual cooling requirements. ADC's cooling is all done from under a raised floor into a containment unit, but is flexible enough to cater for precision cooling options for high density requirements as well as more standard rack requirements. The flexibility in the ADC model allows for either cold aisle or hot aisle containment systems.

Containment

- A presentation at 2008's Data Center Energy Summit found that containment could reduce fan speed in the subject data center by 75%.
- Using cold aisle containment requires less capacity of CRAC units, reducing operation energy consumption and cost.
- The CRAC units are equipped with variable speed fans, which align with the compute load. For fans, speed is directly related to energy consumption: If you reduce fan speed, fan power consumption decreases.
- Instead of addressing an entire room, hot / cold aisle containment (the room within a room) focuses cooling strictly on that load. Right-sizing instead of over or under-cooling will have a significant impact on the cooling portion of PUE.
- With server exhaust controlled, both flavors of containment allow for warmer temperature settings, which can permit more use of water-side economizers. Considering "data center managers can save 4 percent in energy costs for every degree of upward change in the set point, the practice is good for the bottom line and good for the environment.

Cold Aisle Containment

Due to the open architecture of the data centre room, hot aisle/cold aisles cannot attain complete air separation. With the cold aisle encased, the cold air which is delivered from under the floor is supplied to where it's needed the most, at the server intake making this a very efficient means of providing cooling to the IT equipment. The roof and walls of the containment ensure that the only place this air can exit is through the rack mounted equipment. The exhaust air from IT equipment in the racks and because of the boundaries, is directed back to the CRAC units only, eliminating the previous concerns of hot air contamination and hot air recirculation. ADC's Cold aisle containment design and solution can harness that capacity to support higher density cabinet installations without any interruptions to the surrounding infrastructure. With mixing out of the equation, the system can focus on cooling the load instead of the entire room. As a result, the data centre has a more predictable system, a consistent server inlet temperature within very limited affect to the higher server exhaust temperature

Hot aisle Containment

Hot aisle containment turns the hot aisle into its own room, once the cabinets are aligned in the traditional hot aisle/cold aisle layout, the hot aisle is sealed with doors, sidewalls and roof panels. From there, either CRAC or the InRow cooling options take over. Depending on the density requirements of the individual client either cooling choice is a viable option. The Hot Aisle itself is designed to capture the heated exhaust air off the rack mounted equipment and with the use of a CRAC unit the air is removed from the hot aisle and given a separate pathway back to the AC intake without mixing with the cold air, it is then conditioned via the cooling solution and then supplies the air back to the

equipment in cooler conditioned state. Hot Aisle containment separates the supply and return airflow which in turn provides a uniform and predictable temperature to both IT and AC equipment.

In-Row Precision Cooling

In-row cooling is a type of air conditioning system commonly used in data centres in which the cooling unit is placed between the server cabinets the containment system, offering cool air to the server equipment more effectively. In-row cooling systems use a horizontal airflow pattern utilising hot aisle/cold aisle configurations and they only occupy one-half rack of row space without any additional side clearance space. These units may be a supplement to raised-floor cooling (creating a plenum to distribute conditioned air) or may be the primary cooling source on a slab floor.

- Distance is the cornerstone of In-Row performance. Neither cool nor warm exhaust air has far to travel, allowing the units to dissipate high heat loads
- Close-coupled, chilled water cooling can centres up to 40kW

In-Row cooling offers capacity and efficiency gains by moving the air conditioner from the perimeter of the room closer to actual load. Installed between the cabinets, the InRow cooler will support a conventional hot aisle/cold aisle layout with the InRow cooling units providing local, focused cooling to the server cabinets directly.

Key benefits are as follows:

- Eliminates hot and cold air mixing.
- Works in both a raised floor and slab environments.
- Increases cooling capacity.
- Saves energy and improves data centre cooling efficiency.

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