

High Density Cooling

As data center operators move toward blade servers, the power density at the rack levels often rise to 8-10kW per rack and can run as high as 30-40kW per rack for research computing applications. Most data centers, however, were not designed to cool loads of that density and operators are searching for productive alternatives to address the problem.

For operators with a limited number of high density racks it is often possible to address the issue by implementing more stringent operating practices, such as utilizing blanking panels, spreading the high density racks around the raised floor and assuring that air flow under the floor is not obstructed.

As the population of these racks grows it may be necessary to add some level of supplemental cooling, and possibly, develop a strategy to better control air flow. High density cooling options utilized successfully by *idGroup* engineers including both supplemental cooling and primary in-row cooling options.

Supplemental Cooling Options

Rear Door Heat Exchanger

Vette Corporation markets a rear door heat exchanger that conforms to virtually any existing racks and can support cooling densities up to 30kW per rack. This device is exactly what the name implies; it replaces the current rear door of your rack with a passive liquid cooling technology heat exchanger. There are no moving parts, and these units are extremely reliable. *idGroup's* experience is that these rear door heat exchangers are easy to install and require very little maintenance.

Liebert XD System

Another supplemental cooling option is the Liebert XD System. These are refrigerant-based systems that are installed above, between, or on the racks. XD modules, as Liebert calls them, are supported by centralized pumping and chiller units that support multiple modules depending on density. The chiller units can be placed either in the room or outside of it, but strict distance requirements exist and must be adhered to. Our client feedback has revealed that the installation of the piping to support the system was more costly than originally expected. However, as contractors have become more familiar with the system, the costs have fallen significantly. It is, therefore, important to hire a contractor with experience installing this specific system.

In general, our clients have had good results with these systems and they like the flexibility the modular systems provide.

Primary In-Row Cooling

Manufacturers such as APC and Liebert have developed in-row cooling systems that bring the cooling device closer to the source of the heat. This is often referred to as "Close Coupled Cooling." In-row cooling may also be used as the primary system of cooling in a data center that is made up of primary high-density racks. In limited applications adding a few in-row cooling units directly adjacent to the blade server racks can supplement the primary system cooling the remainder of the data center. *idGroup* has used these devices successfully to provide cooling of up to 30kW per rack, with or without a raised floor. Operators do need to be aware that strict adherence to a hot aisle/cold aisle strategy is required. Additionally, it is critical that the system be sized appropriately. If the system is oversized for the application, and adequate lead gain is not provided by the servers, the in-row coolers may not function as they were designed. Therefore, it is important to accurately project your power density during the design process.