

HARDWARE


Channel Checklist: Five ways to save money with server room cooling

Jerome Wendt and Rod Williams
01.30.2008

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Service provider takeaway: *Service providers can help keep server room cooling costs in check by following these five design techniques.*

	
	Best practices for reducing server room cooling costs
✓	Use perforated raised access floor panels in cold rows The old design approach called for placing perforated raised access floor panels below the cabinet to force air into the cabinet. Servers at the bottom of the cabinet stayed cool but servers at the top could overheat. Now, we know that air does not flow from bottom to top but from front to back in racked server environments; therefore, a hot row/cold row design makes more sense. Placing perforated raised access floor panels in the aisles in front of the servers forces the cold air to go through the front of the racked servers, giving all servers from top to bottom access to cold air. The servers draw the cold air in through the front, which more evenly cools the server components, and passes the heated air through the back of the server. The hot air rises and is captured by the data center air conditioning unit.
✓	Run network cabling over the tops of cabinets

	<p>In the past, network cabling was run below the floor tiles and into the bottom of the cabinet. This design restricted under-tile airflow in environments where lots of under-floor cabling was present. Depending on the number of cables and the size of the hole below the cabinet, an uneven amount of air was released into each cabinet. Today, it's clear that network cabling runs and cabling changes occur more frequently than power cabling, so running the network cables over the tops of cabinets makes it easier for service providers to access, run, drop, trace and pull cables. Eliminating under-floor network cables also helps to even out the distribution of cooling through the server room, which means that the air conditioner will need to run less.</p>
✓	<p>Use wire mesh raceways to hold network cables</p>
	<p>In server rooms built years ago, cables were almost always run in troughs beneath the floor. Large holes had to be cut in the troughs and in the floor tiles to feed the network cables into the cabinet. The new approach calls for installing wire mesh raceways (cable trays) above the cabinets. Service providers can drop as few or as many cables through the wire mesh raceway as needed by a specific cabinet; heat goes through the wire mesh raceway instead of around it. However, put the raceway at least 4 inches above the cabinet rather than on it so that you can remove the cabinet without removing the raceway.</p>
✓	<p>Load cabinets with equal numbers of servers</p> <p>The more units in a cabinet, the more power they require, and that means more heat is generated. Note which cabinets are full -- you will notice that they generate more heat and are usually clustered together. An imbalance in the racks can force one air handler (air conditioner) to work harder than another across the room, because air handlers in a data center work most efficiently when they work together to standardize the power supplied to each cabinet. Evenly loading cabinets with servers will regulate the load between the air handlers and result in lower cooling costs. A good rule of thumb is to limit the maximum peak load per rack to around 8.5 kW and the average working load to 5.4 kW.</p>
✓	<p>Use solid wall cabinets</p>
	<p>In the old design, cabinets had holes in the tops and bottoms, and the sides were often removed in multi-cabinet installations. This meant that a large row of cabinets might not have sides except on the ends. As more servers were added to the cabinets, the airflow had to find the path of least resistance to get to the top of the cabinets. This caused some cabinets to be overly cool while others might overheat. Today's rack-mounted servers are designed to cool from the front to the back. Service providers who use solid wall cabinets force the air to come in through the front of the cabinet and exit through the back. These server racks minimize the number and size of holes in the bottom, top or sides of the cabinet, ensuring that the airflow through the racked servers is consistent.</p>

***About the authors:** Jerome M. Wendt is the founder and lead analyst of The Datacenter Infrastructure Group, an independent analysis and consulting firm that helps users make the right storage decisions for their organization.*

Rod Williams currently serves as a data center manager in hardware facilities and planning for a Fortune 500 company.