ASHRAE expands data center temperature range: Who cares?

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The American Society of Heating, Refrigerating and Air-conditioning Engineers has widened its recommended data center temperature and humidity ranges. But do the changes matter to users?

ASHRAE Technical Committee 9.9 (TC 9.9) members reported out on the expanded range last week during a session at the group's winter meeting in Chicago. The ASHRAE extended environmental envelope, as it's called, include the following:

- Expansion of the recommended data center temperature range, which should be taken at the server inlets. They should now be 18 degrees Celsius to 27 degrees (64.4 degrees Fahrenheit to 80.6 degrees), expanded from 20 degrees to 25 degrees (68 degrees Fahrenheit to 77 degrees).
- Data center humidity levels should now be measured by dew point and fall within 5.5 degrees Celsius to 15 degrees (41.9 degrees Fahrenheit to 59 degrees). The previous range was narrower and measured by relative humidity, which ASHRAE decided wasn't as accurate a metric as dew point. For details on the difference between the two, see "Data center humidity levels source of debate.")

"We went through a number of iterations," said Roger Schmidt, a distinguished IBM technologist and an ASHRAE member instrumental in the changes. "We looked at what vendors would be comfortable with." In the end, Schmidt said the group looked to expand the range "to provide greater flexibility in operations."

Temperature changes' impact on users

So does this change matter for users? Some organizations see ASHRAE as a leader in data center infrastructure and design. ASHRAE's expansion of the range allows for some data center efficiencies, such as being able to have the set points on the computer room air-conditioning (CRAC) units higher and not working as hard humidifying and dehumidifying the facility.

"A higher supply temperature does improve energy efficiency," said **Vali Sorell, an engineer at Syska Hennessy Group**. "It allows for a higher supply air temperature so outside air can be available for more hours of the year." Sorell added that in data centers without economizers, it "also allows for a higher chilled water temperature."

But at least one user thinks the recommended range is still too narrow.

Christian Belady, the principal power and cooling architect at Microsoft, said end users shouldn't be "spending all their time and energy trying to hit that bull's eye," referring to the ASHRAE range.

"We need to convince organizations to run it outside of that range," he said.

According to Belady, Microsoft specifies in its requests for proposals (RFPs) that server vendors provide a much wider temperature and humidity range and warranty it. Indeed, among the four major server manufacturers – IBM, Hewlett-Packard, Sun Microsystems and Dell – recommended humidity levels are as low as 8% and as high as 90%, and recommended inlet server temperatures are as high as 84 degrees Fahrenheit.

"My plea to end users is to demand an even broader range, so we don't need all these controls," he said.

That's all well and good, but not everyone has as much pull as a company like Microsoft, which buys tens of thousands of servers every year. Robert Sullivan, a senior consultant at the Uptime Institute, said server vendors often notify smaller companies that warranties are null if the servers run outside ASHRAE's recommended data center temperature and humidity ranges.

Belady agreed and noted later that this was part of his point. Microsoft gets warranties for the much broader temperature and humidity ranges, so why does someone like Belady even care about ASHRAE's recommended ranges? It's a question he said his own boss has asked him.

"Because to me there's a greater good," he said. "At the end of the day, it doesn't really matter to me. But we should be running more efficiently as an industry, and not just as a corporation."