

## Higher Temperatures Plus Low Power Servers Save Money

By David Geer

While vendors are making servers that run on less power, ASHRAE (the American Society of Heating, Refrigerating, and Air-Conditioning Engineers) published new guidelines recommending that data centers operate new and legacy servers with inlet air conditioned to 80 degrees F. Data centers that implement both low power servers and higher inlet temperatures should save on power and cooling.

### **Low Power Server Demand**

Vendors are producing microservers (low voltage servers) using low power Athlon Neo chips. Intel (the Atom) and Via (the Nano 3000 line) are among the vendors answering the competition with low power processors of their own. "But it is not just the CPUs that contribute to lower power use," says Darin Stahl, lead analyst for Info-Tech Research Group. Vendors select all components, including power efficient power supplies, motherboards, and memory to create a lower power draw.

Data centers that consist of large server farms with tens of thousands of compute platforms and processors inside them are the target market for these low power servers. "In those environments, there are so many servers they had to find a way to lower their operating costs," says Stahl.

Small-to-medium businesses that do not have the same processing requirements as large data centers are gravitating toward low power servers with lesser processing power and slighter operating costs, says Darren Bonawitz, principal of 1102 Grand based in Kansas City, Mo.

Data centers that support Web hosting are also looking at power-saving servers. Since servers equipped with low power CPUs cannot handle the same load as high-end servers, for the same money data center managers can save energy by purchasing as many power-saving servers as they need to carry the processing load.

Factors that data center managers need to consider before adopting low-power servers include readiness. Are they ready psychologically to rely on low-power servers as they now count on high-powered servers greater processing power? Are they ready to have their servers failover quickly when these low-power servers reach their capacity?

### **ASHRAE Raises Temperature Threshold**

Low power servers also mean less heat output, which leads to lower cooling costs. But, it appears data centers do not have to keep server rooms as cool anymore. Historically, legacy mainframes required extreme cooling, says Hans Jacobsen, director of the data center at the Stanford School of Medicine.

Approximately two years ago, the ASHRAE committee that covers server room temperatures arrived at a new consensus with IT manufacturers on the inlet air conditioning coming into IT equipment. "It wasn't necessary to keep data centers as cold as they were. The new ASHRAE guidelines say you can run inlet conditions into data center servers to 81 degrees F. Most data centers are down in the 60–70 degrees," Schmidt says. The change to around 80 degrees F can be made today for both legacy

and future hardware, says Roger R. Schmidt, former chair of the ASHRAE committee and current committee member.

It obviously costs less to run computer room air conditioning units at a mere 80 degrees F than it does to cool to 60–70 degrees F. But how did ASHRAE arrive at the higher number? The ASHRAE committee looked at acceptable high and low temperature ranges and high and low moisture ranges for server rooms. While the allowable temperature limit on the high end is 90–95 degrees F, ASHRAE does not recommend it for long periods. The 81 degree F mark is suitable for longer stretches of time.

It is also important to note that internal server fans ramp up when temperatures rise beyond 77 degrees F, says Jacobsen. As fan speeds increase, the servers draw more power, defeating the purpose of creating a savings on both power and cooling. For this reason, some data center managers opt to cool inlet air to 77 degrees F. Jacobsen suggests that managers shopping for servers ask vendors what temperature actually triggers the internal fans in order to help them determine an efficient inlet temperature setting.

ASHRAE also examined humidity to determine a wider margin for acceptable moisture in the air. This gives data center managers more latitude in using outside (free) air for cooling, which adds another savings.

Armed with technology they can acquire (low power servers) and action they can take (raise inlet temperatures), data center managers are a step closer to keeping the power and cooling beasts at bay.

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