

From: Phil Hughes [mailto:phil@clusteredsystems.com]
Sent: Friday, August 15, 2008 7:23 PM
To: Duff, Rebecca M.
Subject: Comments on Draft 2 of Energy Star Server Specification

Greetings,

I am concerned that the specification will be virtually obsolete by the time it is published.

It appears that air cooling is accepted without question. This is a mistake. Using readily available components and subsystems it is possible to build servers with liquid cooling that cost less to manufacture and cheaper to maintain than air cooled servers. Computer racks can be readily adapted at moderate cost to provide the appropriate thermal interfaces, again by using existing components and materials already being manufactured in high volume.

The effect of removing the fans from a server reduces its power consumption between 5 and 10%. However, this is small by comparison with the total energy required for air cooling.

CRACs consume between 10% and 40% of IT load (ie load presented by server minus fans). The heat from the CRAC and server internal fans adds to the chiller load. Typically water cooled chillers require 200W to cool 1KW thus total power required is between 137% and 184% of IT load (ie that consumed by the server minus fans), ignoring conversion & distribution losses.

In contrast, a liquid cooled system only a couple of pumps are needed, using about 3% of IT load. Thus chiller load is 103% of IT load and total power required is thus 121%. By removing air as the cooling medium therefore, savings of between 12% and 35% are achieved. Further savings can be achieved by increasing the chiller output water temperature or even dispensing with the chiller and using only a cooling tower for heat rejection. In a few US locations, the wet bulb temperature never exceeds 65F year round and in many others, for only a few days a year.

I have enclosed a white paper describing the benefits of such a cooling system and its basic mechanism.

We would also like to extend an open invitation to your work group members to visit us and view a demonstration of the technology.

Sincerely,

Phil Hughes