From: Mark Hydeman [mailto:mhydeman@taylor-engineering.com]
Sent: Thursday, February 14, 2008 7:19 PM
To: Duff, Rebecca M.
Cc: fanara.andrew@epa.gov; William Tschudi; magnus Herrlin; Allan Daly; Glenn Friedman; Jeff Stein; Reinhard Seidl; Steve Taylor
Subject: RE: ENERGY STAR Draft 1 Server Specification
Importance: High

Rebecca:

I was glad to see that you included item D for real time power and temperature reporting in Tier 1. This is critical for demand based controls. I would like to see this stated in such a way that these points are accessible and available to an external energy management and control system (EMCS) using standard network protocols like ModBus, BACnet or SNTP.

I was surprised that you didn't include minimum requirements for server delta-T (difference between entering and leaving server air temperatures) when fully loaded. This has a huge impact on the energy usage of the cooling systems since the cooling airflow has to meet or exceed the airflow of the servers to prevent recirculation and hot spots. I recommend that you put a minimum requirement of 30F to 35F for Tier 1 and 40F-45F for Tier 2. As it stands today, design professionals have no basis for knowing what the server delta-T will be since the IT department can select a wide range of products and there is no consistency between them. The attached PDF is from a real project that shows the delta-T of 4 different machines that the IT department used at the time. The servers were considered equal products but had delta-Ts ranging from 21F to 48F representing over a 2:1 range of airflow for the same load. A higher delta-T would also improve the performance of air-side economizers, cooling coils (by reducing the water flow needed), rear door cooling coils (which use condenser water) and heat recovery to name a few measures. This is a critical measure for reducing the cooling energy in data centers.

Related to the delta-T measure I recommend that you require (Tier 1) the server manufactures to provide a Thermal Report conforming with the specifications in ASHRAE's Publication Thermal Guidelines for Data Processing Environments. These are also attached.

The last measure that I recommend is that you require variable speed or 2-speed fans on the servers. As you can see from the attached document one of the servers had a fixed speed fan, one had a variable speed fan and two had two speed fans. This together with the feedback to the control system will help reduce energy when the servers are less than fully loaded. I recommend that you make this a Tier 1 requirement.

I would be glad to provide you with background information on any of these measures if that would help your decision.

- Mark

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Thermal report for servers.pdf   Comparison of server airflows.pdf