

Server Enhancements

Objective

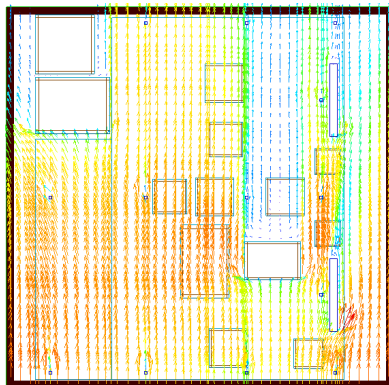
To provide additional function, a server manufacturer needed to add a densely populated daughterboard to an existing motherboard. Air velocity measurements had previously been made on prototype hardware to determine flow characteristics over the card. The company wanted to incorporate these flow conditions in a thermal model to determine if the components on the motherboard and daughterboard were properly cooled. ECS was asked to create the model, determine if cooling was sufficient, and recommend solutions for components that exceeded their temperature limits.

Simulation and Results

A CFD model was created using the component geometry, thermal data, and system boundary conditions provided by the company. Adjustments were made to the model to match the experimental velocities. Component junction temperatures were then determined for both boards. All but two components were found to be within their limits. For these components, additional analysis was conducted that resulted in the recommendation of heat sinks.

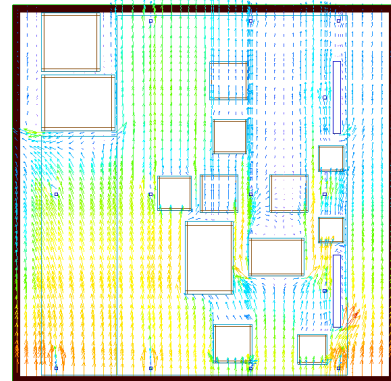
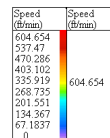
Conclusions

This case study shows how modeling, in conjunction with experimental data, can be used at the prototype stage of a new product to minimize risk and help keep the product on schedule and on budget.



mainboard velocity field
without daughterboard

View: 2D +Z



mainboard velocity field
with daughterboard