

*Leveraging real-time thermal modeling to help address heat-related issues in data centers*



## **IBM IT Facilities Assessment, Design and Construction Services – thermal analysis for high density computing**



---

### **Highlights**

---

- ***Helps lower data-center costs by improving cooling efficiency and reducing related power consumption***
- ***Assists in increasing system uptime by helping to reduce server outages caused by high heat conditions***
- ***Provides information you can use to better understand how to manage data-center growth***
- ***Facilitates the effective consolidation of data-center facilities***

### **Resolving cooling issues in your data center**

The ability to pack greater computing power into a smaller and smaller chassis has compelled enterprises to fill their data centers with racks of servers that process, store and make gargantuan amounts of data available anywhere, anytime. Unfortunately, the work that blade and “pizza box” servers perform consumes power and creates heat. That heat causes equipment to

fail. It limits or prohibits further additions of computing equipment, and it forces companies to operate with excessive energy-related costs.

IBM IT Facilities Assessment, Design and Construction Services – thermal analysis for high density computing is designed to help you identify, address and resolve heat-related issues in your computing environment. Our methodology includes two distinct processes: one allows you to develop thermal solutions for current data centers; the other helps you plan and optimize new data-center facilities. Through analysis of real-time thermal models, we can pinpoint real and potentially unsuitable high-heat areas within a computer room—and create solutions that can help you alleviate the problem. In addition to helping to reduce operating costs by optimizing heat flow and reducing the need for cooling, this thermal analysis can help you increase system resilience, business continuity and productivity.

## **Reducing data-center cooling and power requirements**

IBM uses a proprietary tool called Rapid Thermal Imaging of a Data center (RATID) to develop thermal models of existing computer rooms, enabling you to identify areas of high heat concentration, model mitigating steps to correct the situation, and predict the effect of adding equipment to your computing environment. Thermal models can also be created to help enable you to plan new data centers that will satisfy current equipment cooling requirements as well as support additional equipment underpinning future IT expansion.

By locating temperature variations in the data center, you can better ascertain both whether the air-conditioning system is directing cool air effectively as well as whether you are running the cooling system more than necessary, which is often the case. As noted in a recent *eWeek* article, “Studies from The Uptime Institute indicate that 90 percent of corporate data centers have far more cooling capacity than they need. Data centers examined by Uptime Institute analysts had an average of 2.6 times the amount of cooling equipment they needed but still had hot spots covering 10 percent of their total floor space.”<sup>1</sup>

Thermal analysis for high density computing can help you tune your computer environment—and in turn lower the costs of cooling that environment. Further, leveraging thermal models, you can more accurately predict the thermal impact of any newly installed equipment. Consequently, you are less likely to waste money or create downtime by relocating new equipment that wasn't properly placed and isn't being adequately cooled.

## **Escalating productivity and ROI by extending business continuity**

Every minute of infrastructure downtime erodes employee productivity and makes it impossible for you to do business. Thermal analysis for high density computing can help you better manage the environment of your data center to extend business continuity, augment employee productivity and increase operational efficiency. Servers that overheat to the point of shutdown not only disrupt business, they often also experience a significantly reduced life expectancy. Compounding the potential loss of value from your investment in the server (and the increased costs resulting from having to replace the server), you lose return on investment (ROI) in the infrastructure and applications affected by an outage, since they, too, are idle.

Minimizing downtime due to heat-related server failures helps enable you to operate at peak capacity as well as realize higher return on your investment in hardware, applications and IT infrastructure. Having uninterrupted operations also makes it easier to adhere to regulatory mandates by solidifying asset management tracking and record-keeping. And, whether they are at their desks or in the field, your employees need reliable, secure access to messages, data and enterprise applications to be as productive as possible.

## **Understanding how to intelligently grow your data center**

The ability to grow your data center influences your ability to grow your business. In some environments, high heat conditions prohibit you from adding the equipment you need to speed business processes or adopt new technologies that demand more computing power.

Using the thermal analysis model, IBM can work with you to provide thermal predictive support that can help you to cost-effectively add or relocate equipment, or make modifications to the computer room.

Thermal analysis for high density computing is also designed to help you develop a strategy for data-center growth that can lead to faster, less expensive deployment of business applications and the provisioning of additional data storage. And by generating a real-time thermal model every time a new piece of equipment is installed, you can help to ensure that the equipment will be ideally located and that future modifications or additions will fit in the facility.

Faster processing, driven by greater computing capability, helps you to be more competitive and provide better service to your customers. It also provides the foundation to support emerging technologies, such as enterprise mobility and Voice over IP, that may further boost productivity and decrease operating costs.

#### **Consolidating data centers to control costs**

Of course you are looking for ways to control costs in every part of your business, and the investments you make in your data center can represent a significant portion of your operating expenses. Centralizing data centers can result in lower expenditures on facilities, maintenance, headcount, software and networks.

You can look to thermal analysis for high density computing for help when you're designing and building new data centers, or when you're moving equipment from one computer room to another. Thermal modeling can identify the correct placement of the computer equipment and environmental support to help maximize the effect of the cooling airflow within the computer room. By predicting where high-heat areas will exist, you can mitigate heat-related problems before they happen.

A forward-looking business strategy that includes data-center consolidation can help support the scalability of your infrastructure. Having computing environments that protect your overall investment in IT resources is vital to fostering growth.

#### **Choosing IBM means choosing experience and a tested methodology**

Thermal analysis for high density computing employs a proven methodology for improving environmental conditions in new and existing facilities, helping you to better understand how you can meet the growth and expense challenges of data-center requirements. IBM can help bring the vision you have for your data centers into focus.

#### **For more information**

To learn more about IBM IT Facilities Assessment, Design and Construction Services – thermal analysis for high density computing, contact your IBM representative or visit:

**[ibm.com/services](http://ibm.com/services)**



© Copyright IBM Corporation 2006

IBM Global Services  
Route 100  
Somers, NY 10589  
U.S.A.

Produced in the United States of America  
10-06  
All Rights Reserved

IBM and the IBM logo are trademarks or registered trademarks of International Business Machines Corporation in the United States, other countries, or both.

Other company, product and service names may be trademarks or service marks of others.

References in this publication to IBM products or services do not imply that IBM intends to make them available in all countries in which IBM operates.

All information in these materials is subject to change without notice and provided on an "AS IS" basis without warranty, indemnity or representation of any kind, including the implied warranties of merchantability or fitness for a particular purpose.

- 
- 1 Fogarty, Kevin, "The Greening of the Data Center." Reprinted from [www.eweek.com](http://www.eweek.com), August 21, 2006, with permission. Copyright © 2006 Ziff Davis Publishing Holdings Inc. All Rights Reserved.