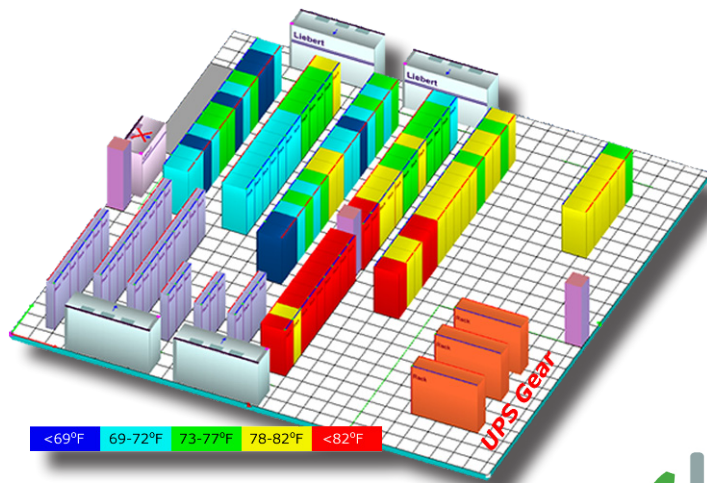




Computational Fluid Dynamics

Computational Fluid Dynamics Analysis of Data Centers



www.AdaptivCOOL.com

Copyright Degree Controls, Inc.
AdaptivCOOL™ & Demand Based Cooling is a trademark of Degree Controls, Inc. All rights reserved.



NER DATA
CORPORATION

NER Data Products, Inc.
307 S. Delsea Drive
Glassboro, NJ 08028
(888) NER-DATA
www.NERdata.com

A typical data center houses hundreds of high powered mission critical IT racks that need to be kept operational 7/24/365. The heat load contained in individual racks can be as high as 25KW. Reliable flow of cold air from the CRACs (Computer Room Air Conditioners) at the right temperature and flow of hot return air back to these CRACs is critical in achieving dependable performance and high efficiency.

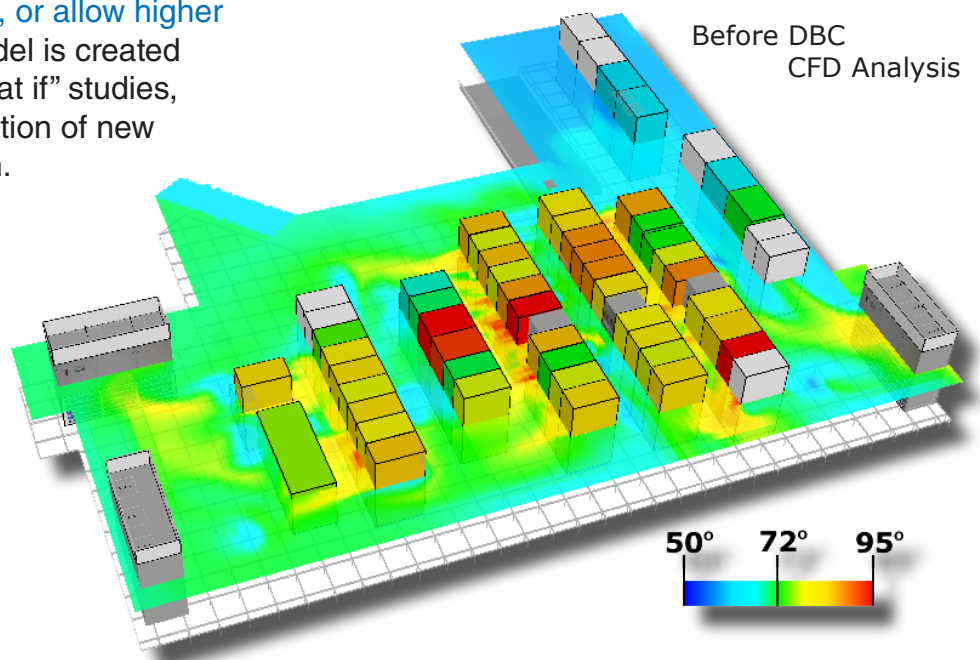
Common Challenges

There are several factors that can affect the efficient operation of a data center. These include:

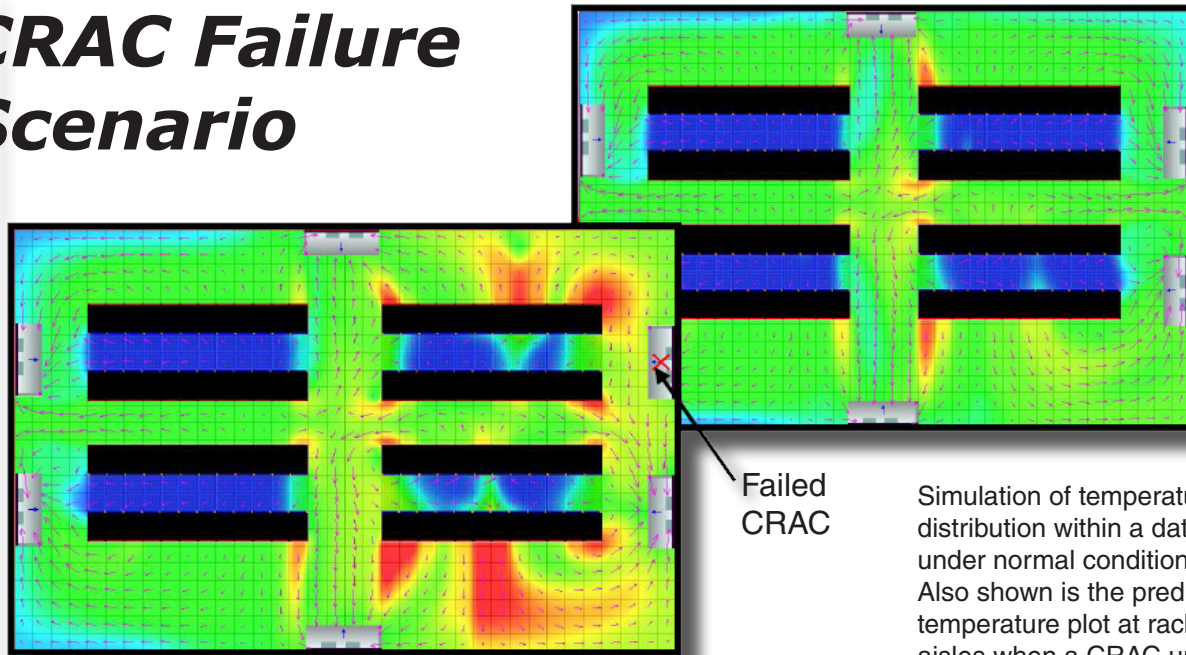
- Positioning of racks and CRACs within the room
- Proper distribution of heat load in the room
- Availability of cooling from the CRACs
- Pathway for hot return air to the CRACs
- Fluctuations in heat output from IT equipment
- Cooling system failure and maintenance
- Airflow obstructions
- Underfloor & Overhead temperature and pressure gradients

How Can CFD Help?

With such variability, combined with turbulent airflow, it is impossible to properly estimate the temperature, airflow or pressure pattern in the room without computer simulation such as CFD Analysis. By employing CFD modeling, rapid characterization of various configurations and solutions can uncover the optimum design or pinpoint the cause of current issues without expensive and risky trial and error. [Properly designed and distributed airflow can reduce Data Center cooling cost by 20%-40% or more, or allow higher server density.](#) Once the CFD model is created it may be used for conducting “what if” studies, such as CRAC failures or the addition of new racks or cooling systems the room.



CRAC Failure Scenario



Simulation of temperature distribution within a data center under normal conditions. Also shown is the predicted temperature plot at racks and aisles when a CRAC unit fails.

How Does CFD Work?

The CFD analysis starts by accurately collecting the physical, environmental, cooling system and power loading information from a data center. Once this information is collected, a precise computer model of the room is created and calibrated to measured data. With a calibrated model; the exact causes of overheating or overcooling can be analyzed and understood. Multiple “what if” scenarios can then determine the most cost effective solutions to solve existing problems or plan for expansion. AdaptivCOOL offers a CFD webinar for your further investigation to determine if CFD is the right analysis tool for you and your data center.

Why AdaptivCOOL for Your CFD Analysis?

AdaptivCOOL (a division of Degree Controls) has been developing precise solutions for complex thermal problems for over 12 years. This experience provides you with the expertise to address and solve your data center cooling issues in a timely, cost effective manner, with no down time to your operation.

