Skyrocketing demand met with improved CFD solutions

Simulated particle traces demonstrate the effectiveness of design changes prior to any investment in implementation.

Owners reap substantial savings when simulated retrofits reveal viable alternatives to new construction

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Highlights

Accurately analyze server and HVAC performance Simulate block and redirect strategies Model geometry in Revit, access fast cloud-processing Generate compelling presentations

The challenge of the digital age

Data center growth in 2014 is projected to match what has only been seen previously in a world economy boom year – approximately 19%.¹ Faced with the expectation that network traffic is expected to quadruple by 2016, officials from companies that operate 100,000 data centers are citing the cost and availability of energy as top concerns for future operations.² These critical parameters are defining the challenge of the digital age: maximizing server capacity and availability while minimizing power consumption.

Necessity brings on opportunity

Computational Fluid Dynamics (CFD) modeling has long been regarded as a highly reliable method for simulating the thermal characteristics of a data center or server room to optimize its conditions. CFD simulation accurately predicts failuremode conditions associated with cooling system shut-downs. It empowers design teams to reduce inefficiencies, maximize "free-cooling" to reduce Power Usage Effectiveness (PUE), and accurately determine if an existing space can be reconfigured to avoid a costly expansion.

In spite of these advantages, most engineering consultants use it rarely, if at all. Due to CFD's traditional high cost and complexity, they tend to rely instead on educated assumptions. Without simulation-informed decision-making, however, data center owners are unnecessarily wasting money. Now that CFD tools are more accessible, CFD-led design is quickly moving from being a competitive differentiator to an essential competency for design teams and data center managers.

Deliver impressive cost-savings

Autodesk customers report that even minimal efficiency measures can conservatively save owners \$1 to \$2 per square foot each year, while expanded measures, such as moving or upgrading CRACs³, can save \$3 to \$5 per square foot

Benefits

Save millions by proving a retrofit strategy over a new build Lower energy costs for the owner, reduce liability for the firm Generate results fast enough to inform design Build credibility and support for winning bids

Get in touch.

Contact your Autodesk Sustainability Solutions team today.

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a year. Smarter purchasing decisions on CRAC units alone can add up to tens of thousands of dollars in savings for owners. And when a retrofit strategy can be proven as a viable means to increase capacity without new construction, millions can be saved on capital expenditures.

CFD's time and cost barriers reduced

With Autodesk Simulation CFD, designers can now review results in less than 24 hours, eclipsing previously used tools that take two to three months to build, mesh and solve. With CFD integrated into BIM, users can now cost-effectively:

• Characterize airflow, identify and mitigate hot spots and establish critical monitoring points (CMPs) Airflow modeled to show overhead ductwork and tile vents effectively pulling heat from high density racks in hot aisle/cold aisle configuration.

Case Study: Sudlows

The challenge:

Sudlows was challenged by their client, a London-based global financial organization, to expand IT equipment capacity within their existing data halls without disrupting operations or adding additional cooling.

The solution:

Using Autodesk Simulation CFD analysis, the team ran multiple conditions and failure scenarios simultaneously in the cloud and employed flexibility in preprocessing physical models and data export.

The results:

- 94 cabinets of capacity added
- Increased direct free-cooling
- Efficiency award recognition: Winner 6th International DataCentre & Cloud Award; DataCentre Solutions Award 2013; Green I. T. Awards 2013 Finalist

- Analyze the impacts of raising temperature set points on server performance and HVAC savings
- Test the impacts of raising relative humidity to make the most of air- and water-side economization



Exploring the opportunity to use entirely free fresh air cooling, a filter wall pulls air from outside into the server room.

• Predict the effectiveness of plans to block and redirect air, utilize outside air, and rearrange air vent tiles

courtesy of Sudlow:

With Autodesk training and support, new users can typically get up to speed on CFD simulation in 2 weeks or less. The investment quickly pays for itself for design teams that can readily justify energy- and cost-saving strategies with confidence.

For more information about Autodesk Sustainability Solutions, contact: sustainability.solutions@autodesk.com.

¹Global Data Center Investment 2013," DCD Intelligence, Data Center Dynamics, 2013 ² Cisco Global Cloud Index, Global Data Center Traffic Forecast, 2012-2017 ³ Computer Room Air Conditioner

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