

White space layout and hot spot analysis

Energy Efficiency for your data center – Application Sheet.
Data center solutions from Siemens for the factories of the 21st century.

The DCIM solution from Siemens, Datacenter Clarity LC™, provides the appropriate tools and allows you to accurately and efficiently manage your infrastructure based on informed decisions.

Challenges:

Data centers are coming under increased scrutiny for their voracious energy appetite. Internally, efforts to increase efficiency are demanded to take advantage of the potential cost savings and demonstrate corporate responsibility. The desire to minimize environmental impact is becoming an equally prominent business driver. However, reducing the overall energy footprint and cost typically requires greater insight into the operation than most IT organizations currently possess.

Establishing a “Green IT” culture in an organization can be a difficult and unnatural change. However, there are tools on the market today that can help smooth the transition and improve the acceptance of this new paradigm. One of the most important tools is a single system of record that tracks and optimizes the entire life-cycle of the data center infrastructure – including the facility, mechanical systems, electrical systems, and IT assets – from design to planning, installation, operation, consolidation, and decommissioning. Gathering this data and information simplifies the next set of fundamental requirements: metering, benchmarking and reporting.

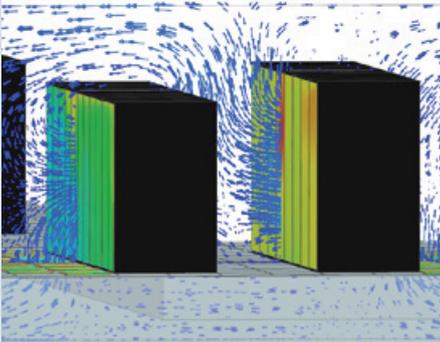
Definition:

White space layout and hot spot analysis require a data center infrastructure management (DCIM) tool that offers asset management and computational fluid dynamics (CFD). With CFD calculations, you are able to virtually observe heat and airflow throughout your data center to

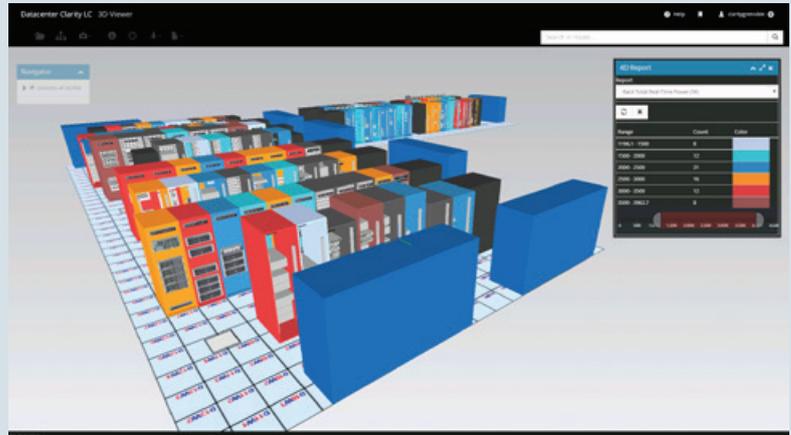
detect hot spots and identify any loss of cold air. This information will allow you to optimize your data center to save energy and costs.

Benefits of DCIM with integrated 3D modeling and CFD capabilities:

The 3D digital modeling capability and the lifecycle asset management platform allow for virtual data center models to be created and simulations applied in an efficient and timely manner. The simulations produce a graphical representation of how the data center will perform in a physical environment, allowing the user to determine ways to improve the IT asset configurations in the white space area. These virtual validations provide assurance that the configuration will meet the efficiency requirements and will continue to do so for the life of the data center. Combining a 3D platform and an asset management system greatly simplifies CFD model creation and the simulation of changes. When data center changes in a white space area are made virtually, the impacts can be assessed and adjustments made before implementation, thereby helping to contain costs and reduce planning time. CFD modeling improves collaboration between facility and IT managers. When investigating expansion scenarios, comparing varying equipment layout scenarios highlights the differences in cooling efficiency, making it easier to quickly assess options and make smart decisions. In data center migration or consolidation situations, there are tools to map and virtually test the consolidated data center in order to optimize cooling



CFD simulation



3D White space layout

and temperature distribution in a white space area. CFD simulations allow data center operators to quickly compare various means to eliminate hot spots, such as server movement, blanking scenarios, and the addition or removal of perforated tiles. With hot spots eliminated before construction begins, the IT team can evaluate whether the set-point temperature can be raised without creating new hot spots and plan their data center cooling environment and consumption in advance.

Conclusion:

DCIM is used to resolve your energy-efficiency challenges. The solution (e.g., Datacenter Clarity LC*) approaches energy efficiency and cost savings from both the infrastructure and asset management perspectives and encompasses the entire data center lifecycle, including concept, design, management, and optimization for the life of the equipment.

As a result of a hot spot analysis, depending on the amount of available white space and the size of the data center, the operator is able to safely increase the set point of the computer room air conditioning (CRAC) unit. Given the DCIM capabilities, he is finally in a position to produce evidence for the set point setting with four different scenarios:

- Simulation of the initial configuration with the highest temperature and hot spots identified.
- Correlation with temperature measurements, increasing confidence in the CFD simulation.
- Reduction of hot spots from the original server configuration by moving the servers within hot spots to the coldest area of the data center.
- Simulation of set-point temperature increased by the difference between the initial configuration and the optimum configuration to see the overall impact.

Highlights

- Creates transparency to monitor, measure and manage, allowing for smarter decisions
- Manages complex data center environments effectively and efficiently
- Real-time picture of asset attributes in 3D
- CFD analysis for airflow predictions
- Protection of long-term investments with simulations based on real-time data

*Datacenter Clarity LC is a trademark owned and licensed by Maya Heat Transfer Technologies Ltd.