

# Computational Fluid Dynamics for Data Centers



Black & Veatch offers hydraulics and computational fluid dynamics (CFD) modeling capabilities that drive sustainability and resilience through informed design. Our integrated design, engineering, and construction approach expands project performance and provides greater cost and schedule certainty for critical infrastructure.

Black & Veatch's ability to leverage CFD modeling and analysis delivers unique benefits to the data center and high-tech manufacturing industries. CFD can accurately simulate turbulent fluid flow, fluid flow and temperature transients, sediment and pollutant propagation, data server and storage assets, and data center cooling equipment operations. CFD modeling enables facilities to identify and analyze problems before they start, and provide the design basis of power and cooling storage capacities.



## Specific benefits from CFD:

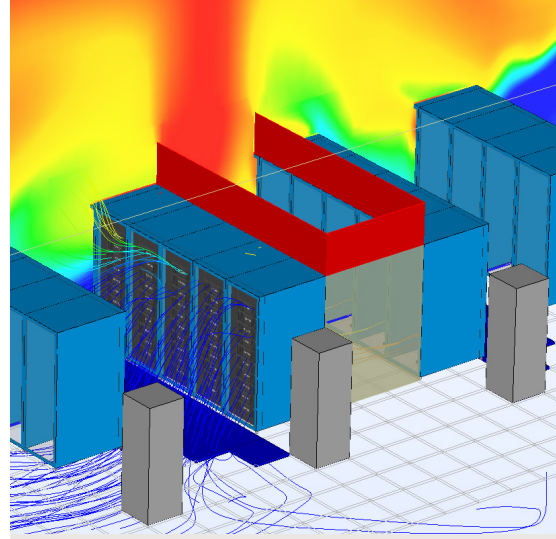
- Drives design excellence and evaluates operational alternatives, minimizes operations issues, reduces maintenance costs, equipment performance and mitigates risks in a virtual environment.
- Provides a better understanding of fluid behavior to optimize cooling and improve efficiency. Enables the rapid simulation and visualization of different cooling scenarios, including chilled water equipment operations. Identifies hot-spots to allow for design and flow alterations.
- Impacts environmental sustainability by optimizing the model of fluid flow in data center environments and identifying solutions to reduce energy consumption.
- Reduces Opex and Capex expenditures with the analysis of operating transients during loss of power and other accident conditions.

Black & Veatch CFD models can also provide IT asset management capabilities, and digital twin models.

## Black & Veatch CFD Modeling License and Hardware Capacity

Black & Veatch's 6Sigma CFD modeling software licenses and hardware allow us to run projects simultaneously. High-end computing power handles complex projects analyzing multiple layers of data at one site or multiple sites. Listed below are the Black & Veatch 6Sigma license capacities with CFD modeling software and hardware:

- One (1) FLOW-3D solver license with parallel processing capability and unlimited pre/post
- Three (3) Ansys CFD premium solver (full capability CFX or Fluent), and three HPC licenses, allowing up to three parallel run queues or one queue in a multicore cluster.
- Six (6) Ansys CFD pre/post/meshing licenses (model setup and post processing with access to four additional seats). Access to cloud-based Ansys CFX/ Fluent resources.
- Six (6) Ansys Design Modeler or Space Claim licenses (3D geometry creation).



## Consulting and Engineering Services for Critical Facility

Black & Veatch was hired by a confidential client to provide consulting and engineering services for nine data centers across the United States. Our primary focus was to evaluate, advise, and provide validation on data center best practices for processes, designs, and identification of remediation tasks. CFD analysis was one of the many processes used to predict fluid mass, thermal flows and monitoring the temperatures within the cabinet units.

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