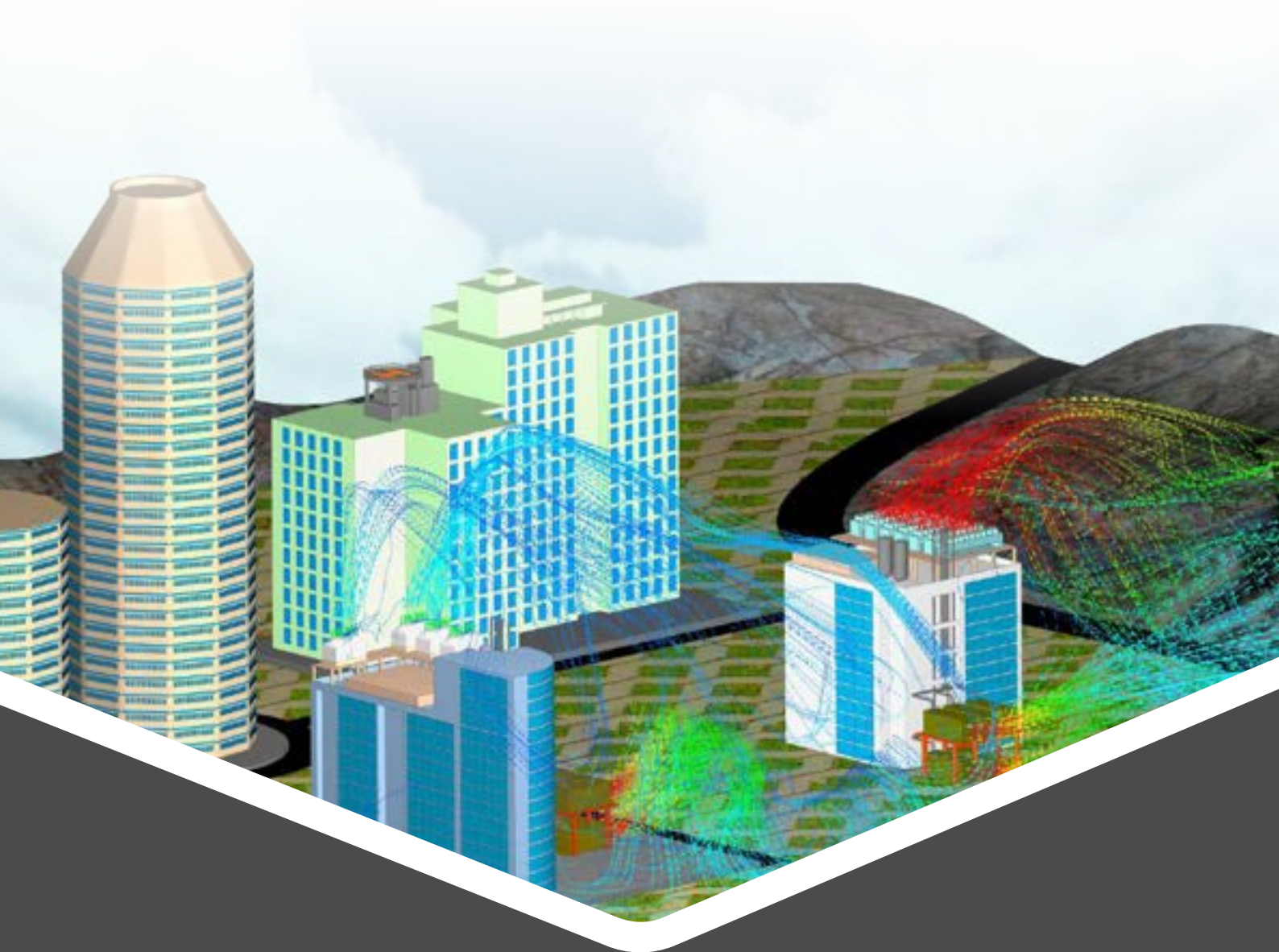


# **CA** PROFILE **SOLUTION**

ENGINEERING A SUSTAINABLE FUTURE



## CORPORATE **BROCHURE**

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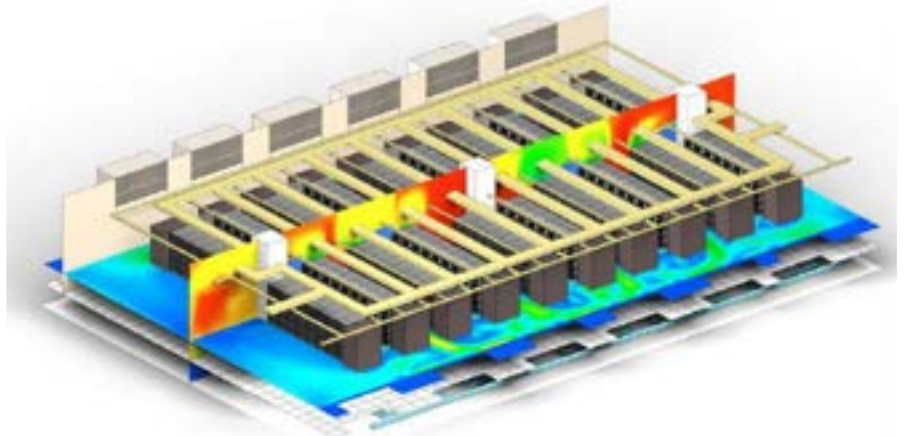
Experts in CFD, FEA & Electromagnetics Simulations

# Our Services

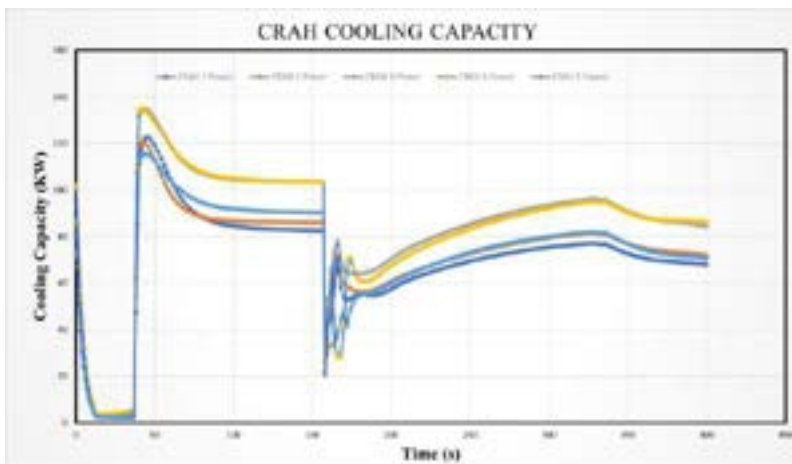
## Data Center CFD Simulations

### ◆ Internal Steady State CFD Analysis

- Data center server halls with or without cold-aisle or hot-aisle containment.
- ASHRAE compliance of server racks inlet temperature.
- Electrical rooms, DWDM rooms, battery rooms, transformer rooms
- Layout optimization for raised floor, false ceiling, supply or return air grills, louvers, caging partitions, cable trays, drainpipes etc.
- Other heat generating equipment like PDU, RPP, STSS, CFP, lighting, building envelop etc.
- Airflow balancing and need for active tiles.
- Capacity optimization and redundancy of air conditioning units like PAC/PAHU/FWU etc.



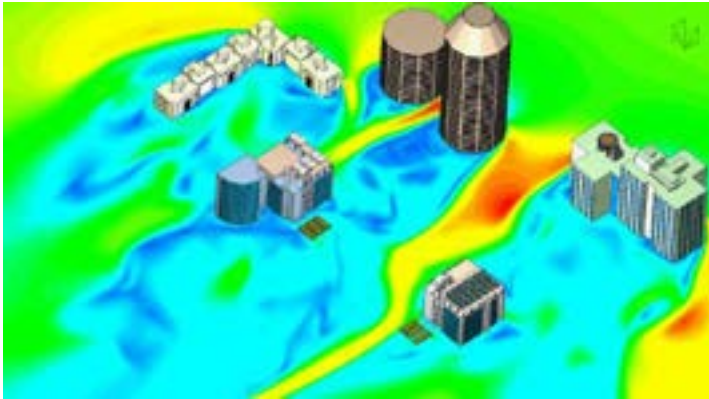
### ◆ Internal Transient CFD Analysis



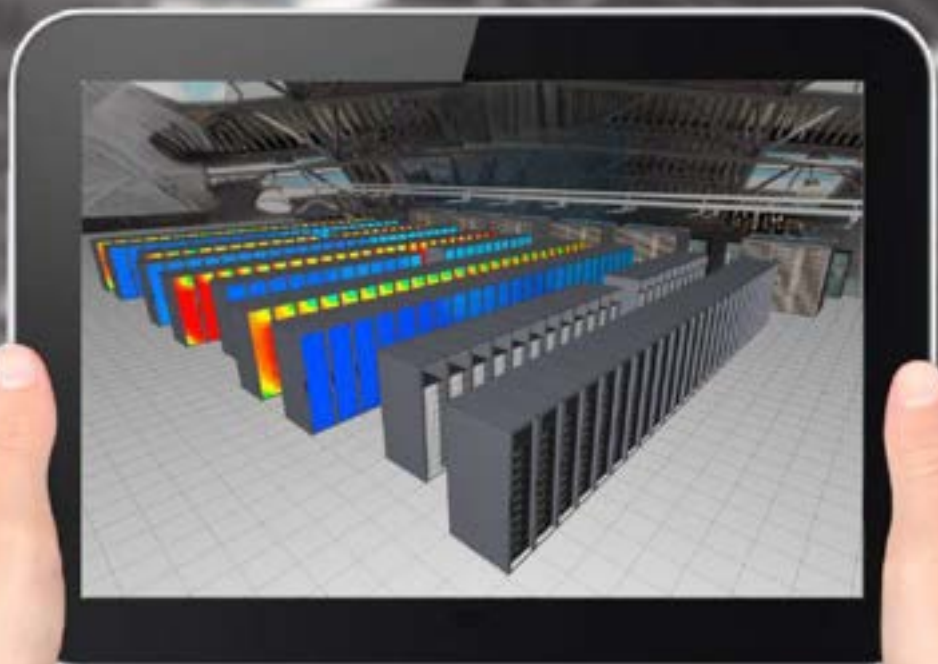
- Variation of temperature and airflow in data hall with respect to time.
- Time required to reach steady state after switching on the air conditioning units or switching off the redundant units.
- Mapping of transient air-side temperatures at CRAH or FWU from chilled water hydronic system CFD analysis for chiller power failure scenario.
- Utility power failure scenario with detailed time sequencing of operations like
  - Switching off the PAC units on raw power supply while keeping the UPS backed still fully functional.
  - Temperature increase in EB to DG changeover time.
  - Start-up sequence of DX units like only blower switching on for few seconds followed by first compressor circuit, second compressor circuit etc.

# Data Center CFD Simulations

## ◆ External CFD Analysis



- Effect of local ambient airflow conditions on data center facility like wind speed, wind direction, ambient temperature, solar loading etc.
- Ensuring minimal interaction of exhaust plumes from DG radiator, DG flue gas and chiller exhaust with suction side of chiller, DGs, VRF units, cooling towers, condenser stakes etc.
- Optimization of building orientation & layout, effect of surrounding buildings & terrain.
- Layout optimization for grating platforms, louvers, parapet walls, blanking panels etc.
- Acoustic analysis for the data center facility.

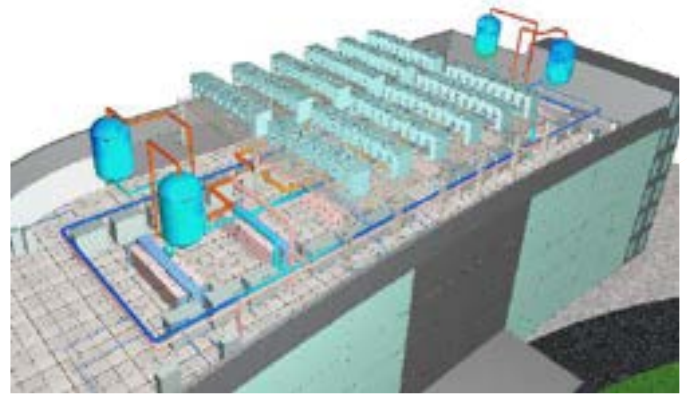




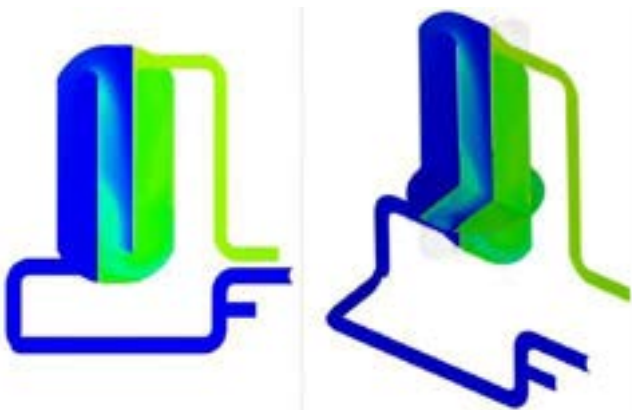
# Data Center CFD Simulations

## ◆ Hydronic CFD for Chilled Water Systems

- Chilled water circuit including buffer tank, valves, pumps, rooftop piping, chillers, floor level supply piping etc.
- Evaluation of backup time in case of chiller failure considering the volume of both inside buffer tanks as well piping.
- Consideration of the UPS backed primary or secondary pumps & valves.
- Re-evaluation of data hall temperature variation in case the supply temperature from buffer tank is increasing beyond SLA.



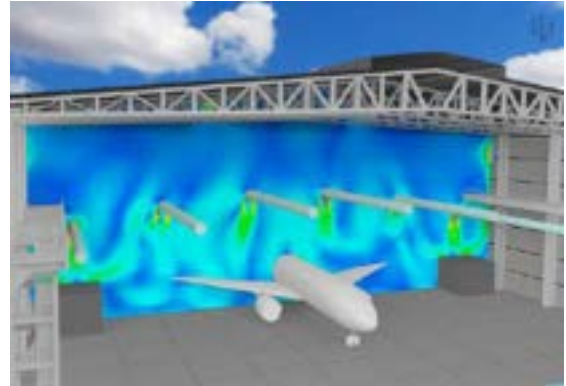
## ◆ Other Analysis Services for Data Centers



- Acoustic simulation of data center buildings for sound pressure level estimation.
- Thermal comfort evaluation in data center office spaces for human comfort indices like PMV, PPD, MAA etc.
- Structural strength or FEA simulation for data center components like containment panel strength under pressure, load bearing capacity of server racks, tiles etc.
- Seismic simulation for data center building.
- Electromagnetic interference or electromagnetic compatibility (EMI/EMC) simulation for data center electronic components.
- Detailed thermal analysis of individual components like servers including the PCB, air handling units, diesel generators, chillers & heat exchangers etc.

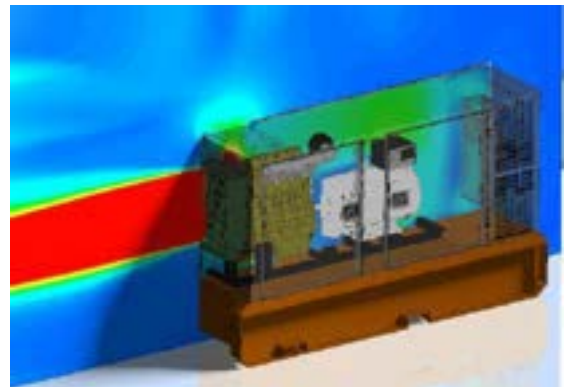
## Other Services

Computational Fluid Dynamics (CFD)  
Finite Element Analysis  
Computational Electromagnetics  
Computational Acoustics  
Discrete Element Methods  
Material Modelling  
Multibody Dynamics  
EMI/EMC Analysis  
AI & ML in CAE Simulations  
AR & VR in CAE Simulations  
Digital Twin



## Product Design

Electric Motors  
Industrial Valves  
Centrifugal Pumps  
Pressure Vessels  
Mixing Tanks, Agitators & Reactors  
Drone Design & Analysis



## Software Solutions

Computational Fluid Dynamics  
Structural Analysis  
Acoustics  
Gear & Transmission Design  
Multibody Dynamics  
Fatigue & Durability  
Materials  
Additive Manufacturing  
Composites  
Forming, Welding, Injection Moulding  
Rotor Dynamics  
Systems & Controls  
Electromagnetics  
Machine Learning & AI  
Optimization and Robustness  
Image Recognition and Compression  
Multidisciplinary Optimization





## ABOUT US

CAE Profile Solution, headquartered in Mumbai (India), comprises of a team of highly qualified engineering and manufacturing experts helping our clients in diversifying their products & capabilities through inherent innovation, right from conceptual design, material selection, detailed design & engineering, through to prototyping, manufacturing, commissioning & in-operation stages. We can assist organizations in improving their product quality through optimization, staying ahead of the competitors by shrinking the product design lifecycle, reducing cost of development, as well as improving productivity through state-of-the-art software portfolio and computing facility.

We are dedicated to assisting organizations in improving energy efficiency, reducing waste, and minimizing harmful emissions, thereby contributing to a more sustainable future.



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