



The Aegis Data Center Services Cooling Analysis uses Computational Fluid Dynamics (CFD) to analyze the airflow and temperature patterns of your existing data center. The CFD software creates a 3D model of the physical attributes within the space, as well as the location and performance characteristics of the cooling units, IT equipment, power systems and any other significant equipment within the data center.

Aegis Data Center Services uses the 3D model to analyze the temperature and airflow patterns within the data center and to determine the effects of cooling equipment failure.

The AEGIS Data Center Services Cooling Analysis uses the CFD service to provide a complete and detailed thermal review of your data center.

This service involves a site visit by Aegis Data Center Services Consultant who will collect data pertaining to:

- The physical layout of the space and the equipment in the data center.
- The data center power equipment thermal dissipation and rack power density.
- The environmental conditions.
- The cooling capacity and utilization and air distribution effectiveness.

The Data Center Services Consultant creates a 3D CFD model of the data center which is based on the information collected onsite.

- This service provides an analysis of a baseline model, an optimized model and a maximized model, which simulates site recommendations.
- An additional benefit of the CFD assessment provides a rough order of magnitude for cost savings applied to improvement recommendations.

1. FEATURES AND BENEFITS

Features	Benefits
A 3D CFD model of the temperature and airflow conditions in the existing data center	Provides a baseline 3D visualization of the data center temperature and airflow patterns; identifies excessive temperatures and restricted airflows that can compromise reliability and the availability of equipment.
Predictive impact analysis of new high density loads	Simulates causality situations and “what if” scenarios. Allows the data center operator to model the results of a planned modifications or to investigate potential failure modes within the data center.
Recommendations to optimize the cooling infrastructure	Identifies methods to maximize the cooling effectiveness of the data center and cost savings based on energy usage.



2. DETAILS OF SERVICE

The specific activities of this service are listed below. For each item, AEGIS Data Center Services will perform the work described.

Power	
Activities	Description
Data Center Power Distribution Review	Record nameplate data, manufacturer, and displayed load readings of power equipment on the raised floor. Analyze data to determine thermal dissipation.
	Record metered load measurements taken at the critical load distribution panel(s) input and branch circuits to determine rack power utilization and to provide an analysis of the data which requires up-to-date panel schedules. Where this may not be accomplished rack power density will be estimated.
	Document excessive load conditions at the critical load distribution panel branch circuit level that may compromise infrastructure reliability.
Cooling	
Activities	Description
Data Center Cooling Distribution Review	Visually assess the Computer Room Air Conditioning (CRAC) and Computer Room Air Handler (CRAH) units. Check for general conditions, improper installation practices, damaged equipment and improper use.
	Identify the system type (i.e. direct expansion, water based or dry cooler, up flow or down flow) and document equipment manufacturer and model number.
	Record and analyze supply and return temperatures, humidity, set points and operational modes to determine environmental conditions and where demand fighting may occur.
	Identify and record the air distribution topology within the computer room.
	Document the rated capacity (based upon nameplate data and manufacturer nominal ratings) of the CRAC/CRAH unit(s).
	Record and document room temperature and humidity levels to ensure that they are within ranges established by equipment manufacturers and recognized industry standards.
Rack Cooling Documentation and Analysis	Identify airflow obstructions within, above and below the rack environment.
	Identify racks where air mixing is likely to occur and where blanking panels should be installed.
	Examine rack enclosures for airflow suitability.



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	Determine the airflow pattern (i.e. front-to-back, side-to-side etc.) of racked and non-racked equipment.
	Detect and document areas where rack inlet temperatures exceed industry standards and guidelines using infrared thermography.

Cooling (cont.)

Activities	Description
Rack Cooling Documentation and Analysis	Analyze rack arrangements for air distribution effectiveness.
	Measure the airflow and temperature of raised-floor air distribution system and overhead grilles, if accessible.
Facility Documentation and Review	Locate significant obstructions under the raised floor and in the drop ceiling that affect airflow. This will be collected onsite or by using customer provided mechanical drawings.
	Determine areas of significant air leakage in the data center.

ACTIVITIES DESCRIPTION

Recommendations for Optimal Air Solution	Provide a comprehensive report indicating conditions that compromise cooling effectiveness and provide recommendations to correct problems.
Drawing of Data Center Floor Plan	Provide a floor plan drawing of the existing data center.
	Provide a drawing of the existing data center depicting measured approximate rack densities and average hot aisle and cold aisle temperatures for comparison to the CFD results.
	Provide a drawing of the existing data center depicting measured raised floor supply tile CFM readings for comparison to the CFD results.
Recommendations for Floor Plan	Provide written recommendations to optimize cooling infrastructure utilization.
	Provide conceptual drawing(s) depicting recommendations for cooling equipment and rack layout.
CFD Model Creation and Analysis	Create a 3D baseline model of the data center based on the existing data center attributes that depicts the airflow and temperature patterns in the space.
	Create an optimized CFD model, based on an analysis of the current baseline model, that models data center layout improvements.
	Create a CFD model of the maximized data center, based on an analysis of the baseline model and elimination of reasonable constraints, that models data center layout improvements.
	Provide an animation, as requested by the customer, of the existing model, the optimized model, and the maximized models.