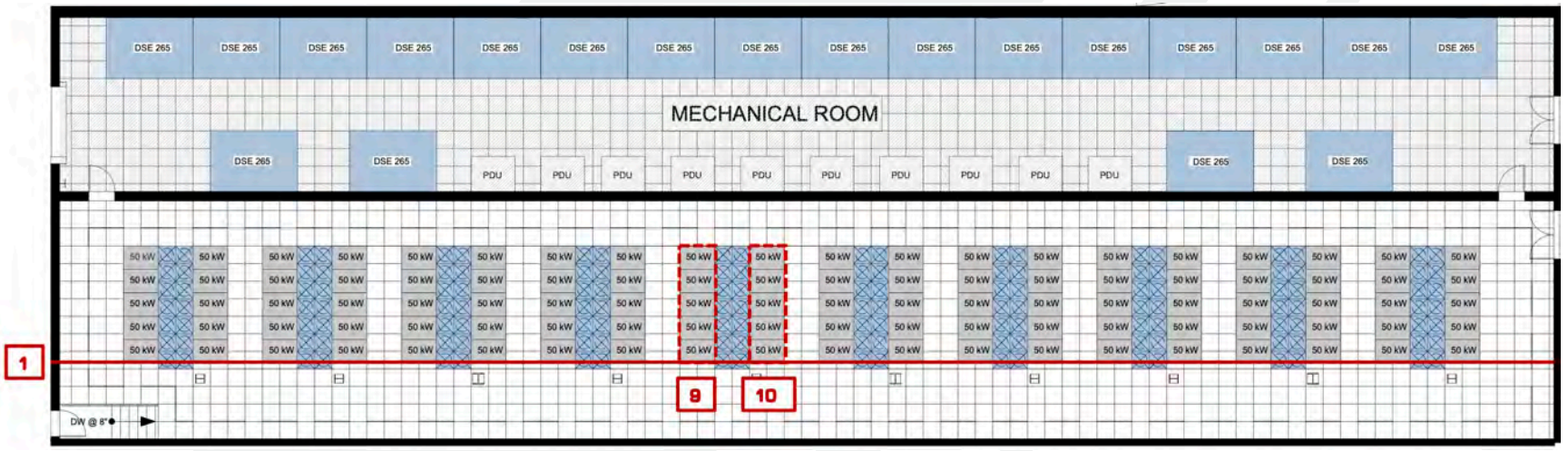
Cooling 50 kW Cabinets with Air

INTERSTITIAL SYSTEMS

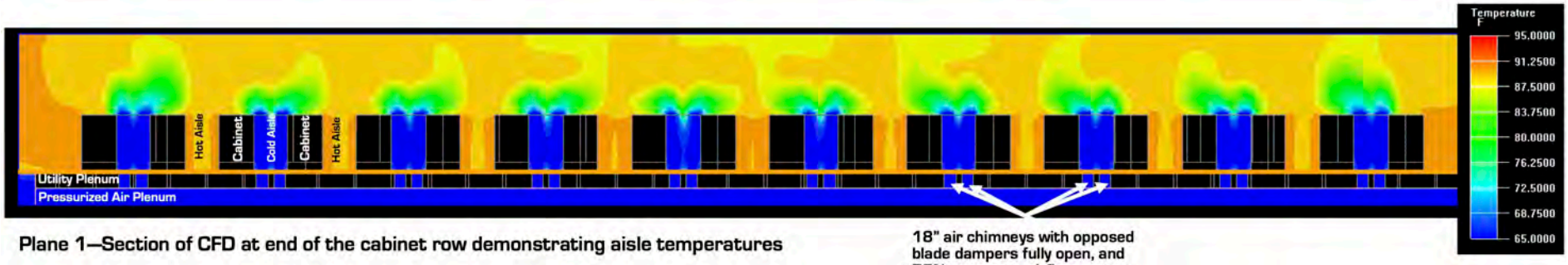
INTERESTED IN EFFECTIVELY COOLING 50 KW CABINETS WITH AIR?

Data Centre cabinet densities and energy consumption has become astronomical to the point where entire regions face electrical energy supply concerns. This has required re-thinking data center cooling approaches such as rear door heat exchangers, a variety of direct to chip cold plates, and immersion tanks. Solidifying corporate plans around these ever-developing cooling approaches is fraught with risk and complexity. All the attention directed to liquid cooling assumes that higher density cabinets cannot be cooled by air. But at what cabinet density does liquid cooling become mandatory? The tipping point to introduce liquid cooling depends on the efficiencies of the air distribution system chosen. With Interstitial's Electro-Mechanical distribution system, for example, air cooled 50 kW cabinets are no problem. If ever there is a need to go beyond 50 kW, the same Interstitial distribution system will easily and more efficiently accommodate liquid cooling as well. Imagine the flexibilities an Interstitial decision made now can offer over the long term—whenever and whatever direction your company chooses to go!

Interstitial's pressurized air distribution plenum provides precision cooling for IT Equipment setting it apart from other air-cooled methods. The plan below demonstrates a compact 5 MW, 8,250 sf space, featuring effective cooling for 100--50 kW 32" X 48" cabinets using 20 Liebert DSE 265s while providing effective N+1 redundancy.



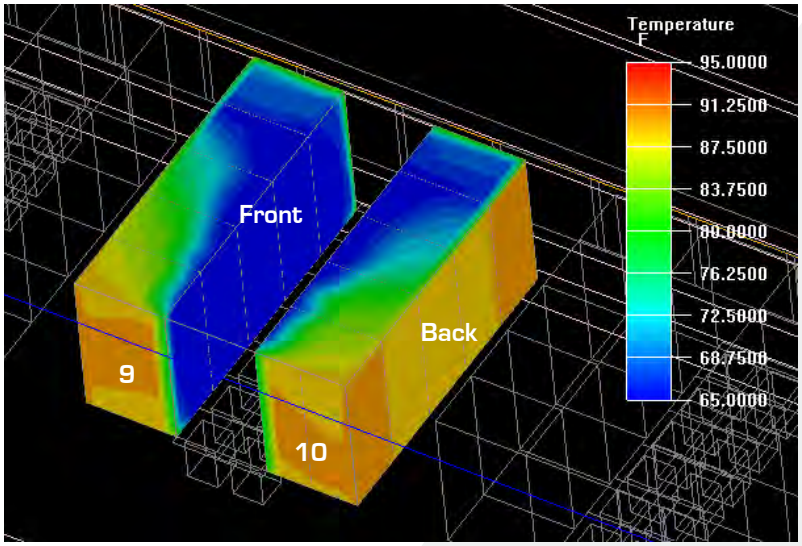
The cross-sectional CFD below at the extreme end of the cabinet row demonstrates effective supply air through the pressurized air plenum through the airflow modules in each of the 10 cold aisles, through the cabinets and discharged in the hot aisles.



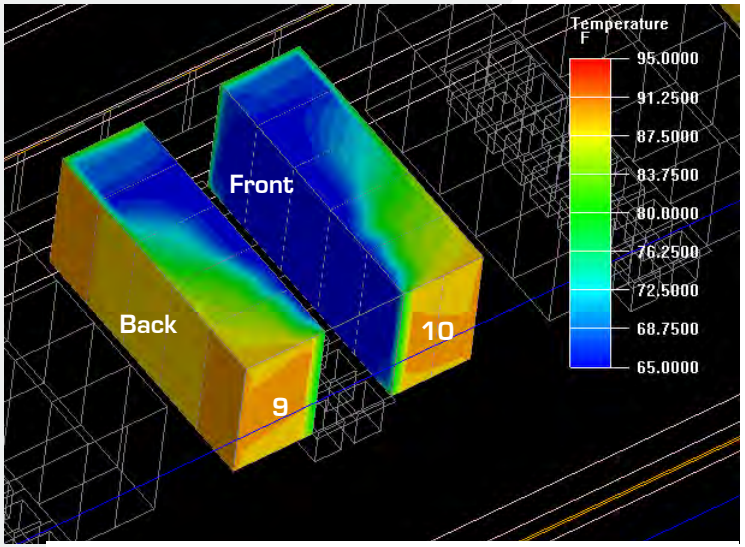
Plane 1—Section of CFD at end of the cabinet row demonstrating aisle temperatures

18" air chimneys with opposed blade dampers fully open, and 75% open area airflow grates

A close-up view demonstrating effective and efficient air distribution is reflected in the images below of two centrally located banks of cabinets outlined in Red (above). Clearly the 65°F supply air is supplied at the front of the cabinets from the bottom to the top of each cabinet as expected. The 90°F return air at the back of the cabinets is in keeping with the 25°F ΔT design parameters.



Cabinet Bank 9 & 10—Front and back of Cabinets



Cabinet Bank 9 & 10—Front and back of Cabinets

Delivering liquid cooling to servers in a new or existing data center is complicated. It comes at a significant cost because of the need for different cooling equipment/techniques and the distribution of pipes and/or hoses through the datacenter. Overhead distribution of coolant is simply not best practice nor does it comply with building standards—this is why sprinkler pipes are empty. Furthermore, supply and return cooling lines should be a dual loop for redundancy—presenting twice the risk of server shutdown do to drips and leaks when installed over IT Equipment. Liquid cooling means more personnel in the sensitive white space for install, service and to remedy failures.

Delay your liquid cooling infrastructure investment until there is a demand for cabinet densities greater than 50 kW. When there is a demand, avoid NFPA issues and excessive risk of server failure by placing coolant hoses under the cabinets in the dead air space of Interstitial's upper utility plenum. Keep it simple, flexible and efficient with Interstitial.

Effective distribution of all services with Interstitial is a reliable proven practice that is simple for technicians managing the facility, even if pipes and hoses are someday required. Interstitial's pressurized air distribution plenum and header design methodology means there is always effective N+1 air redundancy assuring all servers are cooled. There's no risk of water damage to IT equipment with Interstitial. Interstitial and Air provide distribution effectiveness with minimal headaches—a truly "functional" and "sustainable" solution.

Why invest in costly rear door heat exchangers, or immersion tanks when Interstitial does the job effectively, efficiently, at a lower capital cost, while using a smaller footprint with effective redundancy?

A full CFD presentation on this subject is available upon request.

INTERSTITIAL SYSTEMS

Sustainability Follows Functionality

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