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YOUR DATA CENTER AND THE FUTURE OF IT THERMAL MANAGEMENT

A hybrid of air and liquid cooling technologies will usher us into the future of IT thermal management.

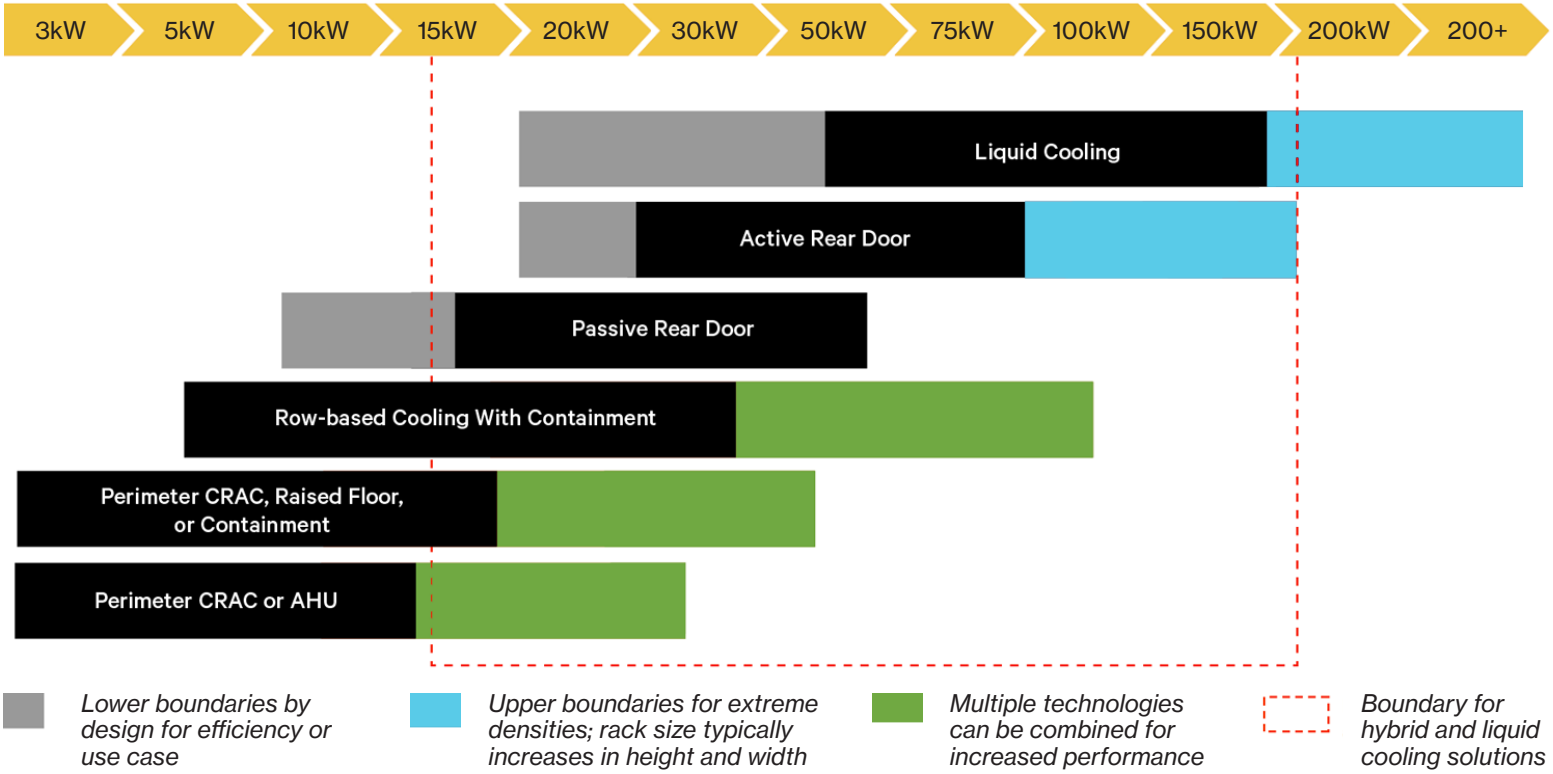
Millions of servers are being used for AI and machine learning (ML) model training, with billions of dollars tied to them. These servers require infrastructure tailored to both enable constant energy to power their processing, as well as to cool the significant amounts of energy expelled.

This guide helps you understand the challenges of these rising power densities and how you can meet the demands they will put on your networks. For starters, since traditional air cooling solutions alone can't properly cool hot-running equipment effectively, at least 61% of operations teams are considering some type of liquid cooling for their facilities.

As you begin to develop a business case to incrementally add liquid cooling across racks and rooms, you will need to evaluate different options and create a road map to phase-in the adoption of new solutions. Additionally, you will find that in order to properly deploy liquid cooling, your IT, facilities, and power teams will need to work together to redesign (or design new buildings) around rack, power, and cooling requirements.

Here, you'll find information on how to evaluate infrastructure requirements, strategies for deployment and maintenance, along with other considerations to keep in mind when it comes to upgrading your operations.

Thermal Management Capabilities At Various Rack Densities



Liquid-cooled systems are often used with air-cooling systems to cool racks at higher densities.

Planning for Liquid Cooling Equipment

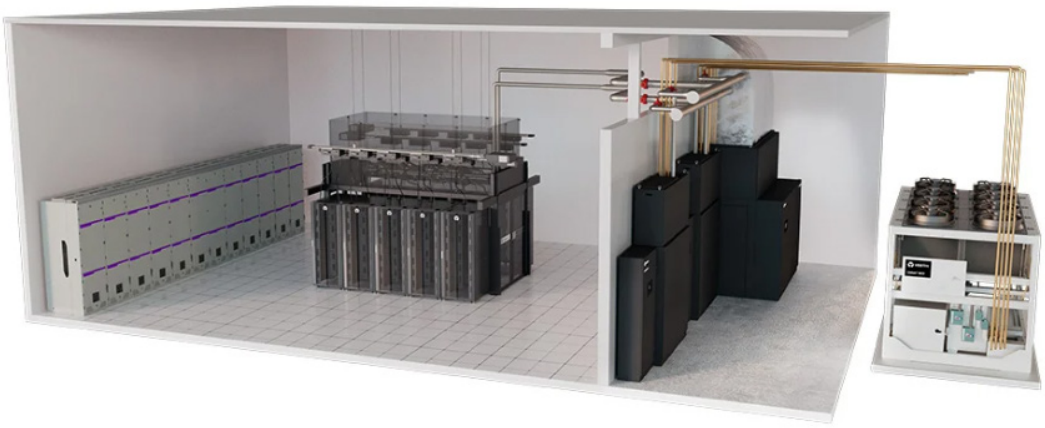
Liquid Cooling
Equipment Type: Rack manifold, CDU, distribution manifold, RDHx

Heat Rejection
Equipment Type: Freecooling or indoor split chiller; drycooler; DX condensing unit

Power Distribution
Equipment Type: High-amperage busway, rack power distribution units

Before Deploying Liquid Cooling

1. Determine your current and future workload requirements.
2. Conduct a site audit.
3. Model new infrastructure in desired space.
4. Consider budget and site impacts.
5. Factor in efficiency and sustainability gains.
6. Design the new solution.



Deployment Timeline

Allow up to a year to deploy new systems.

Allow at least 2 months to: Select vendors, suppliers, and contractors; perform CFD, PUE, WUE, and TCO analyses; conduct site planning; obtain design quote; create a BOMS.

Allow at least 3 months to: Manufacture and transport of liquid-cooled infrastructure, including pipework, rack manifolds, CDUs, heat rejection, power components where required, and racks.

Allow 2 to 3 months to: Conduct site planning and deliver and integrate the new liquid cooling system.

Allow 2 to 3 months to: Integrate IT equipment with new cooling solution and check for any discrepancies. Conduct regular maintenance as needed.

Using liquid-to-air CDUs could speed up deployment times.

Other Considerations to Keep in Mind When Planning Ahead:

- Rack capacities
- Busway capacities
- Redundancy
- Raised-floor weight capacities (if applicable)
- Piping size and placement
- Capability of existing cooling infrastructure
- Leak detection
- Power reconstruction

Preventative Maintenance Tips

You'll will want to ensure that all fluids used in systems are high-quality and consistent across applications, and that any leaks are proactively identified and mitigated.

During routine on-site visits, a certified technician will perform mechanical, electric, and hydraulic visual and control checks, maintain pumps, replace filters, and check for any signs of corrosion. Fluid management can occur during these visits. A certified technician will manage systems to achieve predetermined SLAs and provide ongoing reports.

Managing fluids: Any fluid that passes through manifolds needs to be exceptionally pure. A certified technician should sample fluids at least two times a year, send it to a lab for testing, and take any corrective actions to restore fluid quality.