



BARM

DATA CENTRE SOLUTIONS

BEYOND AIR COOLING
LIQUID AND IMMERSION COOLING FOR
HIGH-DENSITY RACKS



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DATA CENTRE SOLUTIONS

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At **BARM**, we are the architects of resilient, disruption-free Data Centre success. As a premier advisory and project management brand, BARM delivers end-to-end infrastructure transformation services tailored to modern enterprise needs.

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Copper Cabling supporting patch panels



Image courtesy of Bushey Pty Ltd.

Executive Summary

This eBook examines the urgent shift from traditional air cooling to advanced liquid and immersion cooling in today's Data Centres. Driven by the explosive growth of AI and high-density computing, legacy air systems are increasingly inefficient, costly, and unsustainable. This eBook details the limitations of air cooling, the benefits and types of liquid and immersion solutions, and provides supplier comparisons and compliance requirements. Industry findings and real-world case studies demonstrate that liquid and immersion cooling deliver superior energy efficiency, lower carbon footprint, and greater scalability. With regulatory and sustainability pressures mounting, these technologies are now essential for future-proofing Data Centres, reducing operational costs, and enabling heat reuse. The transition is not just technical it's a strategic imperative for modern digital infrastructure.

1. Introduction

The exponential growth of artificial intelligence (AI), machine learning, and high-performance computing has led to unprecedented demands on Data Centre infrastructure. Traditional air-cooling methods, once the default for thermal management, are increasingly inadequate for managing the heat generated by high-density racks and powerful GPUs. As rack densities surge and chip power evolves, air cooling no longer matches the needs of modern Data Centres. This eBook introduces liquid and immersion cooling as viable alternatives, offering superior thermal management, energy efficiency, and operational cost savings. It explores the limitations of air cooling, the benefits and types of advanced cooling technologies, supplier comparisons, compliance requirements, and the strategic imperative for Data Centre operators to adopt these solutions to remain competitive and environmentally responsible.

Chillers on a Data Centre roof



Image courtesy of Bigfootsupport

2. The Limitations of Air Cooling

Since my first job as a teenager straight from school, working for a Financial Institution in the very heart of the City of London in their Computer Operations Team as a Junior Operator, air cooling has long been the default method for thermal management in Data Centres. It relies on fans, HVAC (Heating, Ventilation, and Air Conditioning) systems, and airflow design to dissipate heat from IT equipment. While effective in traditional environments, air cooling is increasingly inadequate for modern high-density and AI-driven workloads.

Developing air flows in compact Data Centres (especially older facilities) can be a challenge as cable routes under raised floors can severely impact the flow of cool air to key equipment.

2.1 Inefficiency in High-Density Environments

For a long time, the average rack density has sat at between 3kW and 5kW with exceptions pushing this up to 15kW draw per rack. Today, we are in the stage of fast evolution as the perfect storm has arrived. With the drive of demands in the market from AI, development of smaller more compact IT equipment, mixed with major evolutions in Chip power, demand for power at the rack face has surged. Rack densities for new technology racks have surged past 50 kW, and in some cases approach 600 kW (as announced in a recent DC Conference for a new Dell Rack), with the result air cooling struggles to keep pace. In essence the Physics no longer matches the need.

According to the [Trend Report: Cooling Data Centres – Enabling the Next Wave of Compute](#), racks exceeding 100 kW are becoming commonplace, and air cooling is reaching its thermal limits. Peter Huang, Global VP for Thermal Management at Castrol, notes that “[74% of operators now view immersion cooling as the only viable path to exascale](#),” highlighting the growing consensus that air cooling is no longer sufficient.

2.2 Increased Energy Consumption

Cooling systems can account for up to 50% of a Data Centre’s total energy usage, as reported by Thomas Grizzetti, CEO of HT Materials Science. The inefficiencies of air cooling, especially in hot climates or poorly optimised layouts, lead to excessive energy draw from fans, chillers, and HVAC systems. This not only inflates operational costs but also undermines sustainability goals.

Computational Fluid Dynamics (CFD) showing DC rack air flows

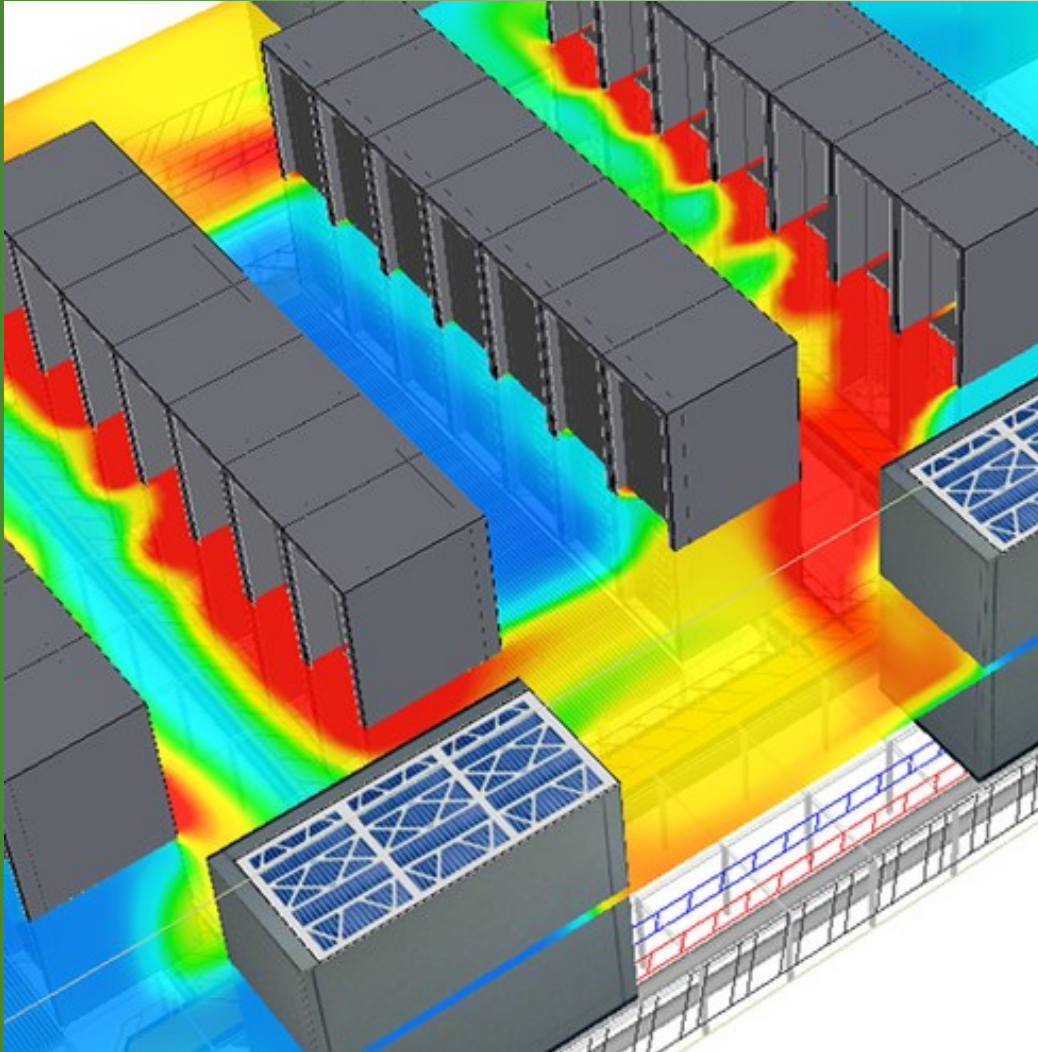


Image courtesy of Sustema

The industry standard metric, Power Usage Effectiveness (PUE), reflects this challenge. While hyperscale operators like AWS and Meta report PUEs between 1.06 and 1.18, the global average still remains around 1.8. Air-cooled facilities often struggle to achieve lower PUEs without significant infrastructure upgrades.

2.3 Limited Scalability for Future Workloads

AI workloads, high-performance computing (HPC), and edge deployments are driving unprecedented compute density. Traditional air-cooling systems are not designed to handle the thermal output of modern CPUs and GPUs operating at higher TDPs (Thermal Design Power). As noted in the Data Centre Dynamics Whitepaper, *“today’s facilities are being pushed to host powerful combinations of CPUs and GPUs that are beginning to exceed the limits of traditional cooling methods”*.

Essentially, we are asking for the Data Centre facilities to provide a service which they were never designed to undertake. Facilities are built for a life of 25 years and so facilities that are 5 years old, or more are going to struggle with the changed evolution of services they are being led towards. Facilities which are older will struggle as they don’t have the power or infrastructure capacity built within the facility, so will need major retrofits undertaken to meet future demand.

This scalability bottleneck forces operators to either reduce rack density, compromising space efficiency, or invest in costly retrofits.

2.4 Hot Spots and Uneven Cooling Distribution

Airflow-based cooling is inherently prone to uneven distribution. Hot spots can emerge due to poor ducting, blocked vents, or suboptimal rack placement. These thermal inconsistencies increase the risk of hardware failure, reduce equipment lifespan, and complicate predictive maintenance.

The *Forbes Council Post* highlights that *“many facilities have seen a decreased life expectancy of the chips that power their business because they’re heating up faster than expected”*. This not only affects reliability but also raises the total cost of ownership (TCO) through increased maintenance and replacement cycles.



Image courtesy of Airsys Datarak

2.5 Compliance and Standards

In Australia, Data Centres must comply with national and international standards that govern cooling performance, energy efficiency, and environmental impact.

The key standards include -

- **AS/NZS 3666** – Air-handling and water systems of buildings, which includes provisions for microbial control in HVAC systems.
- **Uptime Institute Tier Standards** – These define infrastructure redundancy and cooling reliability across Tier I to Tier IV facilities.
- **ANSI/TIA-942 Standard** – Categorises Data Centers into four distinct 'Rated' levels, each with specific requirements and capabilities – Rated-1 to Rated-4 facilities.
- **ASHRAE TC 9.9 Guidelines** – Widely adopted for thermal management best practices, including recommended temperature and humidity ranges for IT equipment.

Failure to meet these standards can result in regulatory penalties, increased insurance premiums, and reputational damage.

Immersion Tank cooling Server Infrastructure



Image courtesy of Schneider Electric

3. Liquid Cooling Technologies

Liquid cooling has emerged as the cornerstone of the next-generation Data Centre design, particularly as AI workloads drive up rack density and thermal demand. Unlike air cooling, which relies on fans and chilled airflow, liquid cooling uses fluids, typically water or dielectric liquids, to absorb and transfer heat directly from IT components.

3.1 Why Liquid Cooling Is Gaining Momentum

According to the Uptime Institute, average rack power density increased by 38% from 2022 to 2024, with AI clusters now pushing 80–120 kW per rack. Traditional air-cooling systems are no longer viable at these densities. Higher thermal conductivity than air is now required, enabling efficient heat removal at the source.

Liquid Cooling offers us :-

Reduced energy consumption, with PUE scores consistently below 1.2 in liquid-cooled facilities compared to 1.4–1.6 in air-cooled ones.

Improved scalability, allowing denser compute configurations and smaller data halls.

“Liquid cooling is no longer a niche technology. It is the industry standard for hyperscale workloads, AI training clusters, and sustainable Data Centre builds.” — Datacenters.com

3.2 Types of Liquid Cooling

Liquid Cooling is not a one size fits all solution. There are many suppliers who have developed prototypes utilising variable fluid types. You only had to walk around the recent Data Centre Exhibitions to see the variety of products available ranging from dielectric waters to oil variants. The tank infrastructure also varies, yes, they still look like chest freezers filled with fluids, but this will evolve very quickly.

SUPPLIER	TECHNOLOGY FOCUS	STRENGTHS	LIMITATIONS
Vertiv Group Corp.	D2C & CDU Systems	Broad portfolio, EMEA availability	Higher upfront costs
Schneider Electric	Modular CDU & rear-door	Award-winning modular designs, EcoXpert partner	Retrofit complexity in legacy sites
CoolIT Systems	D2C for AI clusters	AI-ready, scalable, used by hyperscalers	Requires training for operational teams
LiquidStack	Two-phase immersion	High efficiency, supports 600kW+ racks	Complex chemistry, higher maintenance
Submer & Asperitas	Single-phase immersion	Proven in crypto and HPC clusters	Requires rack redesign
Arteco (ZITREC® EC)	D2C fluids & webinars	Educational outreach, fluid innovation	Limited global footprint

The cooling methods that have evolved over recent years are:-

Direct-to-Chip (D2C) Cooling

Cold plates are mounted directly onto CPUs, GPUs, and memory modules. A closed-loop system circulates coolant through these plates, removing heat at the source.

Pros - High efficiency, modular design, automated leak detection.

Cons - Requires specialised server hardware and plumbing infrastructure.

Rear-Door Heat Exchangers

Liquid-cooled panels fitted to the back of server racks absorb and remove heat from exhaust air.

Pros - Retrofit-friendly, reduces ambient temperature.

Cons - Less effective for ultra-dense workloads.

Immersion Cooling

Entire servers are submerged in dielectric fluid. Two main types -

Single-phase - Coolant absorbs heat and is circulated.

Two-phase - Coolant vaporises and re-condenses for higher heat transfer.

Pros - Ideal for ultra-high-density racks (80–100 kW+), minimal airflow requirements.

Cons - Requires redesigned watertight pods and advanced fluid chemistry.

3.3 Supplier Landscape and Product Comparisons

The 2025 Data Centre Cooling Company Evaluation Report identified the top 23 global leaders in liquid cooling. Some of the key players include (see chart opposite).



3.4 National Standards and Compliance

In Australia, liquid cooling systems must comply with several national and international standards:

- **AS/NZS 3666** – Governs microbial control in HVAC and water systems.
- **ASHRAE TC 9.9** – Provides thermal guidelines for IT equipment, including liquid cooling best practices.
- **EU & Singapore Regulations** – Increasingly mandate water conservation and heat reuse, which liquid cooling supports.

"Regions like the EU, California, and Singapore are implementing stricter regulations around Data Centre energy and water consumption. Liquid cooling enables compliance with these emerging standards." — Datacenters.com

3.5 Economic and Environmental Impact

The adoption of liquid cooling technologies in Data Centres is driven by both compelling economic returns and significant environmental benefits. These solutions not only reduce operational costs and energy consumption but also support sustainability initiatives and enable new opportunities for heat reuse.

- **ROI** - Most deployments achieve return on investment within 2–4 years, thanks to reduced energy costs and increased compute density.
- **Sustainability** - Liquid cooling supports heat reuse in district heating, aquaponics, and industrial processes, already mandated in parts of Scandinavia.
- **Market Growth** - The global liquid cooling market is projected to grow from \$4.1 billion in 2024 to \$19.4 billion by 2031.

Air Cooled Warm Aisle Containment of Racks



Image courtesy of Bushey Pty Ltd.

4. Comparative Analysis

Comparative Analysis of Cooling Methods

As Data Centres evolve to support AI, HPC, and hyperscale workloads, the choice of cooling method becomes a strategic decision. Below is a comparative table followed by an in-depth analysis of each method, supported by industry data and supplier insights.

COOLING METHOD	EFFICIENCY	SCALABILITY	COST	MAINTENANCE
Air Cooling	Low	Moderate	Low	High
Liquid Cooling	High	High	Moderate	Moderate
Immersion Cooling	Very High	Very High	High	Low

Air Cooling

Overview

Air cooling remains the most widely adopted method, using fans, heat sinks, and CRAC/CRAH systems to dissipate heat and will remain popular for low heat applications..

Industry Findings

Air cooling is cost-effective for legacy systems but struggles with high-density racks.

According to Chris Frye of LG Electronics, "[Managing heat from increased Data Centre demands is becoming a challenge for traditional air-cooling systems](#)".

Pros

- Lower upfront cost
- Simpler infrastructure
- Easier to retrofit

Cons

- High energy consumption
- Poor thermal efficiency at scale
- Larger physical footprint

Standards

AS/NZS 3666 for HVAC microbial control

ASHRAE TC 9.9 for airflow and temperature guidelines

Liquid Cooled Racks



Image courtesy of Schneider Electric

Liquid Cooling

Liquid cooling uses water or dielectric fluids to remove heat via cold plates, rear-door heat exchangers, or in-row systems.

Industry Findings

Liquid cooling can reduce energy consumption by up to 40%.

The Green Grid reports up to 48% energy savings with liquid cooling.

Capex is roughly equal to air cooling at 10 kW/rack, but 10–14% cheaper at 20–40 kW/rack due to compaction.

Pros

- High thermal efficiency
- Lower operational costs
- Ideal for AI and HPC workloads

Cons

- Moderate upfront cost
- Requires infrastructure upgrades
- Risk of leaks (mitigated by dielectric fluids)

Standards

AS/NZS ISO/IEC 27001 for uptime and risk

ASHRAE TC 9.9 for liquid cooling best practices

EU and Singapore regulations on water conservation

Liquid Cooling Suppliers & Products

SUPPLIER	PRODUCT TYPE	PROS	CONS
Vertiv	Rear-door heat exchangers	Modular, scalable, widely supported	Retrofit complexity in legacy sites
CoolIT Systems	Direct-to-chip cooling	AI-ready, used by hyperscalers	Requires trained staff
Schneider Electric	In-row cooling systems	EcoStruxure integration, energy dashboards	Higher initial investment

Servers being cooled in Immersion Tank

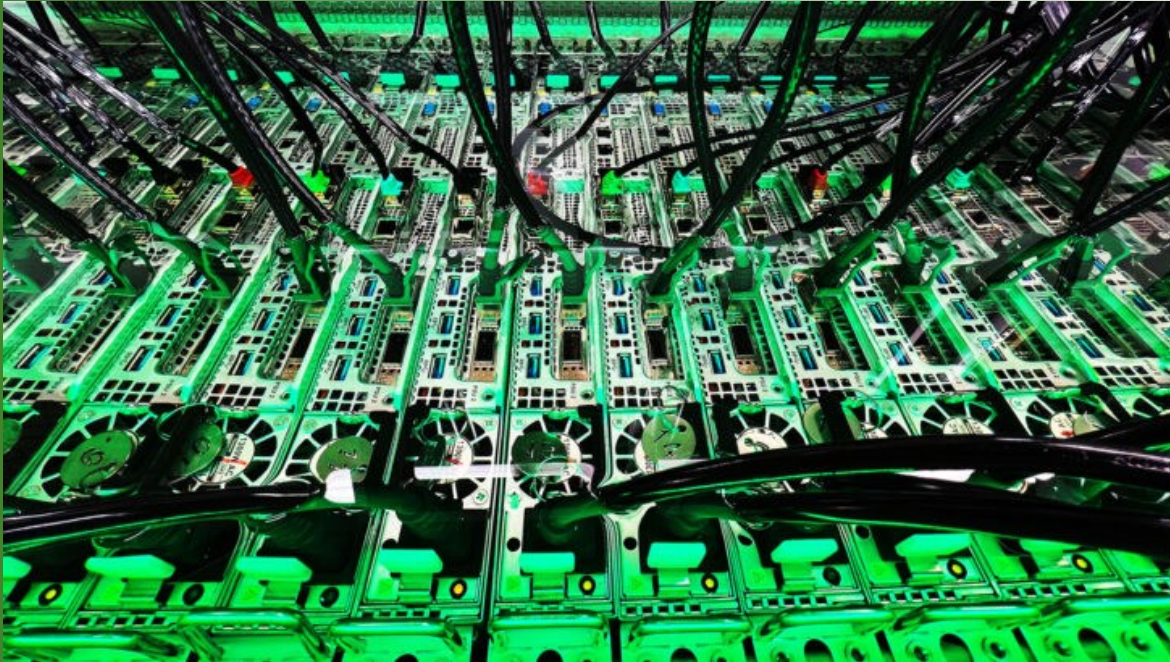


Image courtesy of Intel

Immersion Cooling

Immersion cooling submerges servers in dielectric fluid, enabling uniform heat exchange and eliminating fans.

Industry Findings

Immersion cooling offers exceptional thermal efficiency, especially for racks exceeding 80 kW.

Capex savings of 10–14% at higher densities due to reduced infrastructure.

Ideal for AI training, crypto mining, and HPC.

“Immersion cooling achieves exceptional thermal efficiency because the entire device is submerged in liquid, allowing for uniform heat distribution.” — Lori Thermal Systems

Pros

- Very high efficiency
- Minimal maintenance
- Compact footprint

Cons

- High initial cost
- Requires specialised fluids and sealed chassis
- Complex equipment handling

Standards

- **AS/NZS 3666** for water systems
- **ASHRAE** guidelines for immersion cooling
- **WUE** (Water Usage Effectiveness) tracking for sustainability

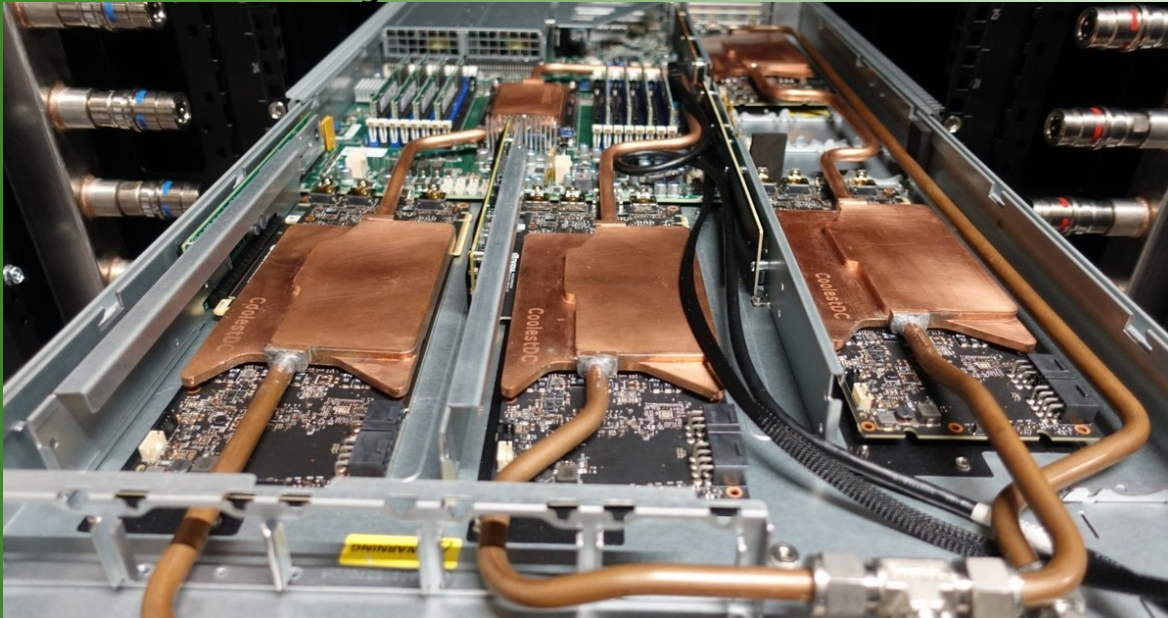
Cost and ROI Insights

Air Cooling: Lower initial cost but higher long-term operational expenses.

Liquid Cooling: Moderate upfront cost with 40–48% energy savings and ROI within 2–4 years.

Immersion Cooling: High initial cost but up to 14% capex savings at 40 kW/rack due to compaction.

Cooling Plates installed within a Server



5. Implementation Considerations

Transitioning to Liquid or Immersion Cooling

The shift from air-based cooling to liquid or immersion cooling is no longer a futuristic concept, it is a strategic imperative for Data Centres aiming to support high-density AI workloads, reduce operational costs, and meet sustainability targets. This transition demands meticulous planning across infrastructure, operations, and compliance. Issues resulting in service impacting issues are generally caused by human failures/mistakes and so retrofitting facilities, implementing new infrastructure places the Facility on high alert as works are undertaken without impacting live services within other halls.

5.1 Infrastructure Modifications

Liquid cooling systems require significant changes to the physical layout and mechanical systems of a Data Centre. These include:

- **Cold plate** installations for direct-to-chip cooling
- **Coolant Distribution Units (CDUs)** for fluid circulation
- **Heat exchangers** and dry coolers for heat rejection
- **Watertight pods** for immersion cooling setups

According to Supermicro Experts, "*Infrastructure modifications might include anything from the installation of cold plates to the deployment of pumps, heat exchangers, and coolant distribution units*".

These upgrades must be tailored to the specific cooling architecture, whether direct-to-chip, rear-door heat exchangers, or immersion tanks.

Although, the process for replacing racks with a new floor of tanks, it must be considered that Immersion Tanks full of fluid, plus the IT equipment is considerably heavier than a rack of air-cooled equipment. This places stress on floor plate weight loads and so typically DC Operators are placing these either in small halls or on ground level data halls specifically designed for Tanks.

Immersion Tank Operations requires new skills for Ops

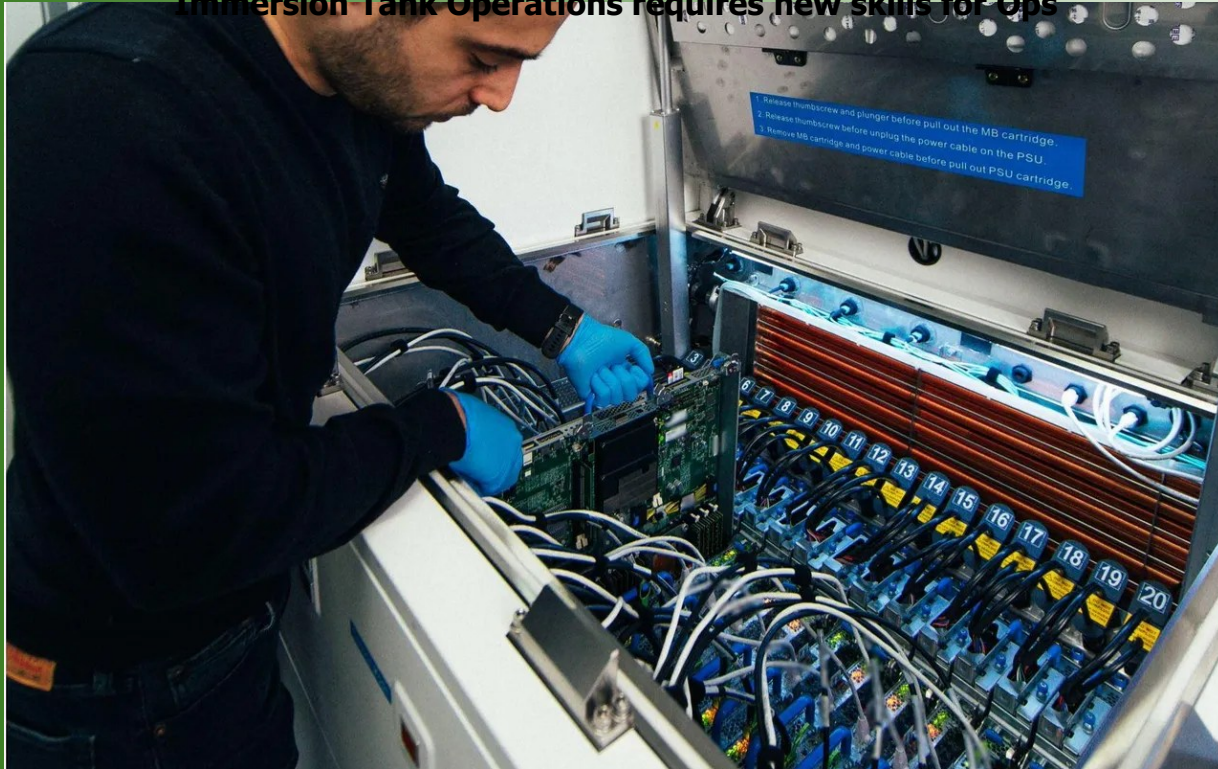


Image courtesy of ZDNet

5.2 Staff Training and Safety Protocols

Transitioning to liquid cooling introduces new operational risks and maintenance procedures. Staff must be trained in -

- Coolant handling and leak detection
- Pump and flow rate management
- Emergency shutdown protocols
- Monitoring systems and telemetry dashboards

Modern systems include automated leak detection and telemetry, but human oversight remains critical. As noted by Datacenters.com, "*Facility operators trained on air systems must learn new service protocols. Vendors are addressing this with certification programmes and hands-on training courses*".

New Operational Procedures need to be developed and tested so that the Operational Teams are able to effectively manage their equipment in the Tanks without spoiling equipment and the environment around the tanks. This raises questions on whether tanks will be managed by the customer or only the Data Centre Provider.

5.3 Compatibility with Existing Hardware

Legacy servers and racks may not support liquid cooling without retrofitting. Compatibility assessments should include -

- Rack density and layout
- Power delivery and cable routing
- Server chassis design
- Integration with Building Management Systems (BMS)
- Hybrid cooling models, such as rear-door heat exchangers, can bridge the gap by integrating with existing air-cooled infrastructure.

Then there is the issue of bring fluid pipes into the Data Hall – once a hallowed space exempt of any fluid. Now the tables have turned and fluid is being introduced into the very equipment we kept far away from any fluid.

Heat Exchange Kyoto Wheel



Image courtesy of Kyoto cooling

5.4 Vendor Selection and Fluid Management

If you are building a Data Centre for your own use choosing the right vendor is essential for long-term reliability and ROI. Select a suitable Data Centre advisor who can advise and guide you to the right selection of equipment, this is their day job and not just a one off project.

5.5 Economic and Environmental Justification

Despite higher upfront costs, the long-term benefits are compelling -

- Energy savings** of up to 40% compared to air cooling
- PUE scores** consistently below 1.2 in liquid-cooled facilities
- ROI within 2 - 4 years**, especially in AI and HPC environments
- Heat reuse** for district heating and industrial processes

The global liquid cooling market is projected to grow from \$4.1 billion in 2024 to \$19.4 billion by 2031, driven by AI workloads and sustainability mandate

Vendor Selection and Fluid Management

SUPPLIER	TECHNOLOGY FOCUS	STRENGTHS	LIMITATIONS
LiquidStack	Two-phase immersion	Supports 600kW+ racks, high heat transfer	Complex chemistry, high initial cost
Submer	Single-phase immersion	Proven in crypto and HPC clusters	Requires rack redesign
Vertiv	CDU and rear-door systems	Modular, scalable, EMEA availability	Retrofit complexity in legacy sites
Shell	DLC Fluid S3	Advanced dielectric fluid for direct cooling	New entrant, limited deployment history

Fluid management involves selecting coolants with optimal thermal conductivity, corrosion resistance, and environmental safety. Dielectric fluids are preferred for immersion cooling due to their non-conductive properties.

Chip Level Cooling Plate

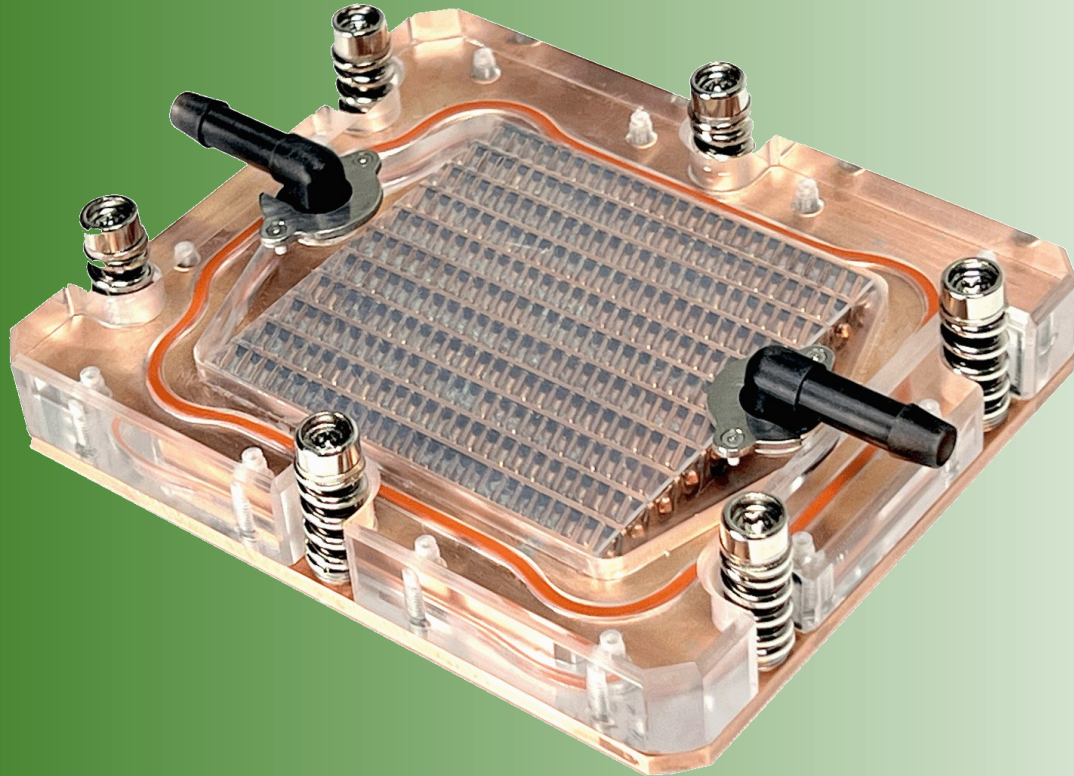


Image courtesy of Chillidyne

6. Environmental and Economic Impact

Advanced cooling technologies, particularly liquid and immersion cooling, are reshaping the environmental and economic landscape of Data Centre operations. These methods not only support sustainability goals but also deliver measurable financial benefits over the infrastructure lifecycle.

Environmental Impact

Lower Carbon Footprint

A landmark study by Microsoft published in Nature found that -

- Cold plate cooling reduces greenhouse gas (GHG) emissions by 15–16%
- One-phase immersion by 13–16%
- Two-phase immersion by 20–21% compared to traditional air cooling

These reductions are even more pronounced when paired with 100% renewable energy, which can cut GHG emissions by 85–90%, regardless of the cooling method.

“Highly optimised cold-plate or one-phase immersion cooling technologies can perform on par with two-phase immersion, making all three liquid-cooling technologies desirable options.” — Microsoft Research Team

Reduced Water Usage

Water Usage Effectiveness (WUE) is a critical metric for sustainable Data Centres. The same Microsoft study found:

- Cold plate cooling reduces water use by 31–50%
- One-phase immersion by 45–80%
- Two-phase immersion by 48–82%

This is especially vital in regions facing groundwater shortages, such as parts of Australia.

Supplier Landscape and Product Comparisons

SUPPLIER	TECHNOLOGY FOCUS	STRENGTHS	LIMITATIONS
LiquidStack	Two-phase immersion	Highest efficiency, ideal for new builds	Uses PFAS-based fluids under regulatory scrutiny
Submer	One-phase immersion	Strong environmental performance, lower cost	Requires flammable hydrocarbon oils
Vertiv	Cold plate & CDU systems	Retrofit-friendly, scalable	Copper components need frequent replacement
Castrol / Shell	Fluid management services	Full lifecycle support from install to disposal	New entrants, limited deployment history

Potential for Heat Reuse

Liquid and immersion cooling systems enable heat reuse for local district heating, aquaponics, and industrial processes. This aligns with circular economy principles and is increasingly mandated in regions like Scandinavia and Singapore.

“Data Centres can become heat heroes by capturing and repurposing waste heat, turning a liability into a sustainability asset.” — Datacentre Solutions Magazine

Economic Impact

Lower Energy Bills

Cooling systems can account for up to 40% of a Data Centre’s energy consumption. By switching to liquid or immersion cooling, operators can reduce energy demand by 15–20%, leading to substantial savings over time.

Extended Hardware Lifespan

Immersion cooling maintains consistent thermal conditions, reducing thermal stress and extending the lifespan of servers and components. This lowers replacement frequency and supports better asset utilisation.

Reduced Downtime and Maintenance Costs

Immersion cooling systems have fewer moving parts and eliminate airborne contaminants, resulting in -

- Lower failure rates
- Reduced maintenance cycles
- Higher uptime and availability

Compliance and National Standards

In Australia, transitioning to advanced cooling technologies must comply with:

AS/NZS ISO/IEC 27001 – Ensures secure and resilient infrastructure

AS/NZS 3666 – Governs microbial control in HVAC and water systems

ASHRAE TC 9.9 – Provides thermal guidelines for IT equipment and cooling systems

Science Based Targets Initiative (SBTi) – Calls for a 42% reduction in GHG emissions by 2030 to meet net-zero goals

Data Hall of Immersion Tanks



Image courtesy of Thermofisher

Conclusion

Liquid and immersion cooling technologies are no longer experimental, they are essential. As Data Centres face exponential growth in AI workloads, high-density compute, and sustainability mandates, these advanced cooling methods offer unmatched scalability, efficiency, and environmental benefits.

Industry Findings

ASHRAE TC 9.9 confirms that “liquid cooling is becoming a requirement in some cases and should be strongly and quickly considered” due to rising chip power and reduced case temperature tolerances.

GRC + Intel report that immersion cooling captures 100% of server heat, compared to just 30% with air cooling, and reduces energy consumption by 10–15%.

Marc Bhuyan, Google ML Infrastructure Manager, stated: “*There’s a fair amount of consensus that the end game is using immersion cooling*”.

National Standards and Compliance

In Australia and globally, operators must align with:

ASHRAE Thermal Guidelines (2021) – Updated water classifications (W17 to W+) and performance requirements.

AS/NZS ISO/IEC 27001 – Ensures secure and resilient infrastructure.

AS/NZS 3666 – Governs microbial control in HVAC and water systems.

Science Based Targets Initiative (SBTi) – Calls for a 42% reduction in GHG emissions by 2030.

Cold Plates installed in Servers (Schematic)

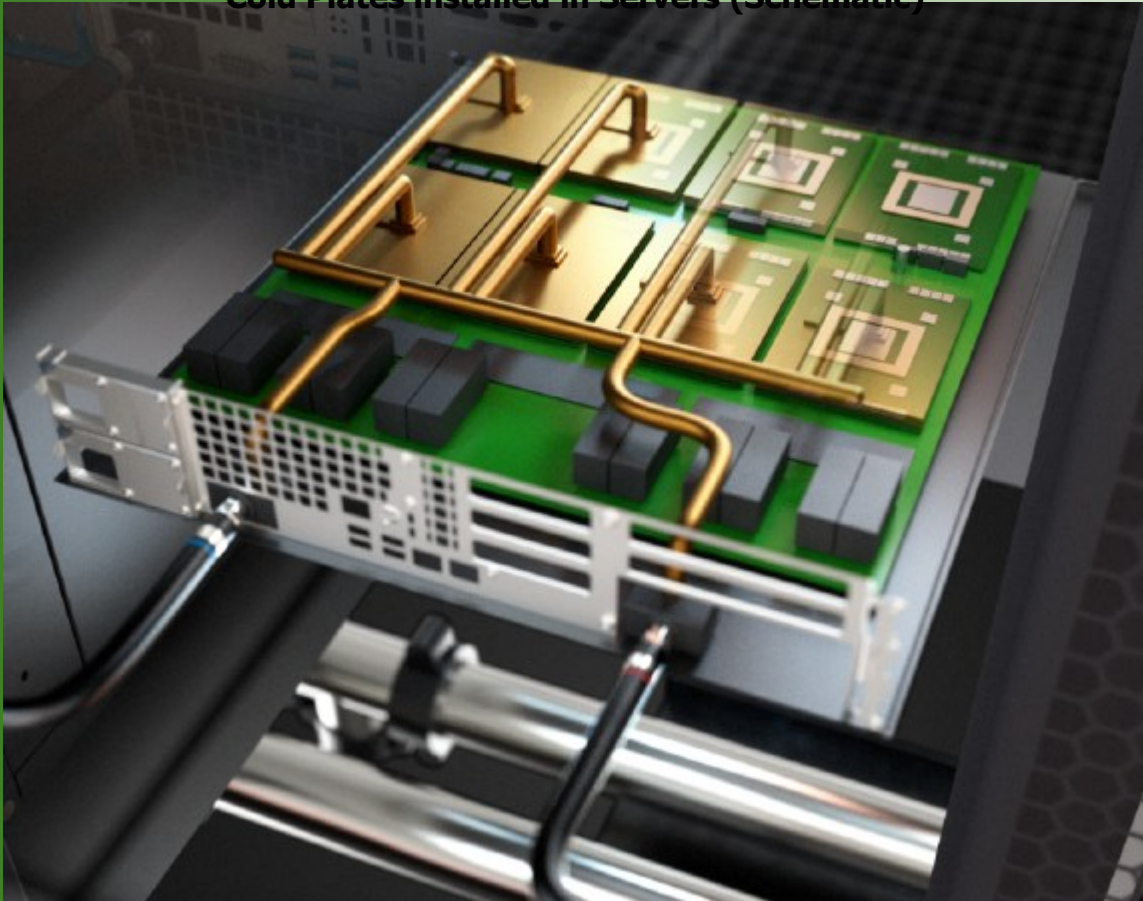


Image courtesy of Vertiv

Final Thoughts

I have been standing up at Conferences for many years stating that we cannot continue in this industry with the core cooling methods that had not changed in 25 years of my time of working in and around Data Centres. It was important for the Data Centre and IT equipment manufacturing leaders to join to resolve the way forward and I am pleased to say we are now on the road to a new dawn in Data Centres, and IT hosting. The new Data Centre will take a new look, don't expect facilities with floors full of tanks, facilities will be hybrid for some time as low power usage platforms will continue to be hosted in racks i.e. network appliances etc.

The transition to liquid and immersion cooling is not just a technical upgrade, it is a strategic move toward operational excellence and environmental stewardship. With regulatory pressures mounting and AI workloads surging, Data Centre operators must invest wisely and act decisively. They must also educate the market as we still see businesses not wishing to be the leaders into new technologies and happy to sit in the middle of transformations.

By embracing these technologies, Data Centre organisations can -

- Achieve **PUE scores below 1.2**
- Extend their hardware lifespan (a big plus for DC customers)
- Reduce energy and water consumption (always good on corporate sustainability reports)
- Enable **heat reuse** for circular economy initiatives (always good but it is not good grade heat, but good for tomato greenhouses though)

The future of Data Centre cooling is liquid. The question is no longer *if*, but *when*, and when will liquid cooling surpass air cooling, it may be a lot sooner than you think.

Barry Lewington - Director



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About BARM

At BARM, we understand that Data Centres are the heartbeat of modern IT operations.

For IT professionals, the pressure to deliver secure, scalable, and efficient infrastructure is immense, and that's where we come in. With over three decades of global experience across APAC, Australasia, the Middle East, Europe, and North America, BARM offers deep expertise in Data Centre design, migration, optimisation, and management.

We speak both the language of IT and facilities, bridging the gap between technical teams and operational stakeholders to ensure seamless execution. Our services span the full lifecycle of Data Centre transformation. We begin with comprehensive infrastructure audits and assessments, followed by strategic planning and tool selection.

Whether you're deploying DCIM solutions, migrating workloads, or optimising capacity, we guide you through every step, from configuration and alert setup to automation and performance baselining. We excel in change management, helping teams adapt to complex migrations and implementations.

Our approach prioritises data integrity, compliance, and risk mitigation, ensuring business continuity and reduced downtime. We also help identify cost-saving opportunities through improved resource utilisation and energy efficiency.

Beyond technical delivery, BARM provides strategic insights through market assessments, helping you evaluate site suitability, resilience, and alignment with business goals. Whether you're expanding, consolidating, or future-proofing your infrastructure, our assessments empower confident decision-making.

For IT professionals, partnering with BARM means gaining access to seasoned experts, proven methodologies, and peace of mind. We don't just deliver services, we deliver outcomes that support innovation, scalability, and long-term success.

Let us help you turn complexity into capability.

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