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Case study

NEXTDC, Vertiv and Partners Deliver Australia's First Liquid-Cooled AI Centre of Excellence



Background

To help customers navigate the transition to AI-driven computing, NEXTDC collaborated with Vertiv, Castrol and SRA Solutions to establish Australia's first liquid-cooled AI Centre of Excellence across its S3 Sydney and M1 Melbourne facilities. Designed as live demonstration environments within colocation data centres, the NEXTDC Liquid Cooling Centres of Excellence provide customers and partners with direct access to a real-world AI deployment, showcasing how power, liquid cooling and rack infrastructure work together to support next-generation AI workloads.

As artificial intelligence (AI) and high-performance computing (HPC) workloads continue to scale, data centre operators face increasing power demands, thermal loads and rack densities that exceed the thermal management capabilities of traditional air-cooling approaches. Organisations are increasingly turning to liquid cooling technologies capable of supporting the performance, efficiency and scalability requirements of modern AI environments.

To support the initiative, NEXTDC selected the Vertiv™ SmartRun prefabricated modular infrastructure platform as the foundation for both Centre of Excellence deployments. Combining Vertiv's expertise in modular infrastructure and liquid cooling with Castrol's thermal fluid technology and SRA Solutions' AI-ready rack systems, the Centre of Excellence serves as a blueprint for how future AI-ready data centres can be designed and deployed at scale.



Company Profile: NEXTDC is one of Australia's leading data centre providers, operating a national network of carrier-neutral, Tier III and Tier IV-certified facilities supporting enterprise, hyperscale, government, and research organisations.

Industry: Data Centres / AI Infrastructure

Region: Australia (NSW and VIC)

Key Benefits:

- Australia's first liquid-cooled AI Centre of Excellence established across Sydney and Melbourne.
- Operational demonstration of production-ready AI infrastructure within a live colocation environment.
- Estimated project timeline reductions of 30% to 75% through prefabricated modular deployment methodologies.
- Support for AI infrastructure densities up to 480 kW per rack.
- Integrated power, cooling, containment and networking infrastructure through a single modular platform.
- Scalable architecture designed to support future AI growth and evolving compute requirements.

Challenges

AI infrastructure is fundamentally changing data centre design requirements. While traditional enterprise workloads typically operate below 20 kW per rack, next-generation AI deployments are increasingly driving rack densities above 80 kW and, in some cases, several hundred kilowatts per rack. These environments require significantly greater power delivery, thermal management and infrastructure integration than conventional data centre architectures.

For NEXTDC, the challenge was not only to deploy liquid-cooled AI infrastructure, but also to create a live environment where customers could experience and evaluate production-ready AI technologies operating under real-world conditions. The solution needed to integrate power distribution, liquid cooling, containment, connectivity and high-performance compute infrastructure within operational colocation facilities while maintaining deployment efficiency and scalability.

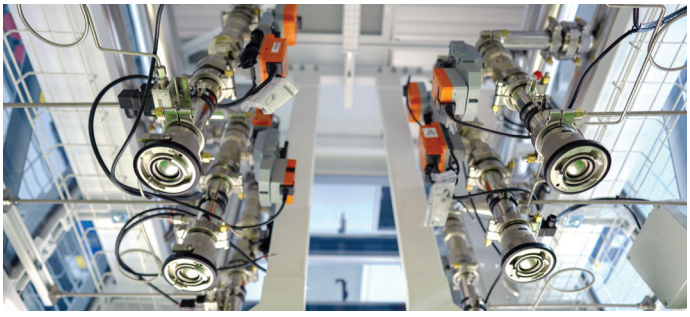
The project also required close coordination across multiple technology providers and infrastructure disciplines. Commissioning liquid-cooled environments demanded rigorous preparation and testing procedures to support reliability and performance before the introduction of high-value AI equipment.

"Delivering next-generation AI infrastructure requires more than individual technologies; it requires a strong ecosystem of partners working together to solve increasingly complex power, cooling, compute and deployment challenges. The Liquid Cooling Centre of Excellence deployments are great examples of what can be achieved when industry leaders combine their expertise to create a production-ready environment that helps customers better understand and prepare for the future of AI," ***said Robert Keegan, AI and high-performance computing solutions director at NEXTDC.***









Solution

At the core of the deployment is the Vertiv™ SmartRun prefabricated modular infrastructure platform, which consolidates power distribution, cooling, containment and network infrastructure into a single integrated overhead system optimised for AI and liquid-cooled environments.

Unlike traditional data centre construction approaches that install infrastructure components individually on site, the Vertiv SmartRun applies a manufacturing-led methodology in which critical infrastructure is engineered, assembled and validated prior to deployment. This approach helps reduce installation complexity, improve deployment consistency and accelerate project delivery timelines.

Thermal management is delivered through the Vertiv™ CoolChip CDU 1350 liquid cooling solution, which circulates coolant directly to high-heat components such as GPUs and CPUs. By removing heat closer to the source, the system supports the thermal performance and efficiency requirements of high-density AI infrastructure that exceed the practical capabilities of conventional air cooling.

"At NEXDC's Liquid Cooling Centres of Excellence, we provided the infrastructure backbone, bringing together modular deployment, power, liquid cooling, and services expertise into a single integrated environment. Using Vertiv SmartRun and our direct-to-chip cooling technologies, we built a live operational showcase where customers can see AI-grade infrastructure handling real workloads at over 100 kilowatts per rack. It's not a demo, it's production-ready infrastructure operating under real-world conditions. We helped transform the Liquid Cooling Centres of Excellence from a concept into a live operational showcase of high-density AI infrastructure," ***said LuLu Shiraz, Country Head and Senior Director, Sales Australia and New Zealand at Vertiv.***

Supporting the deployment, SRA Solutions supplied AI-ready rack systems engineered specifically for liquid-cooled environments, while Castrol PG25 cooling fluid provides thermal transfer characteristics required for sustained high-density operation. Vertiv also delivered startup, commissioning and maintenance services to support both the S3 and M1 deployments.

"AI infrastructure introduces new requirements for rack design, liquid cooling integration, cable management, and serviceability. Our role was to provide a rack platform engineered specifically for these high-density environments, enabling customers to see how advanced AI infrastructure can be deployed in a practical and scalable way," ***said Leeroy McLeod, Sales Director, ANZ, SRA Solutions.***

"As AI workloads continue to increase in density, thermal management becomes a critical enabler of performance and reliability. The Centres of Excellence demonstrate how advanced cooling fluids and liquid cooling technologies can work together to support the next generation of high-performance AI infrastructure," ***said Mark Roberts, Data Centre Market Development Director at Castrol.***



Results

The Liquid Cooling Centres of Excellence demonstrate how liquid-cooled infrastructure can support AI deployments at scale while providing organisations with a practical blueprint for future AI-ready data centres.

Industry Leadership

With both the S3 Sydney and M1 Melbourne deployments, NEXTDC has established Australia's first liquid-cooled Centres of Excellence, positioning the organisation at the forefront of AI infrastructure innovation in the Australian market.

Customer Education and Engagement

The Centres of Excellence provide customers with direct access to a live production environment where they can experience AI-ready infrastructure and liquid cooling technologies firsthand. This enables organisations to better understand the operational requirements and benefits of high-density AI deployments.

Accelerated Deployment

The deployment showcased the benefits of a prefabricated modular infrastructure approach through the use of the Vertiv™ SmartRun platform. By integrating critical infrastructure into a modular design, SmartRun has the potential to reduce on-site installation complexity, minimise labour requirements, and streamline project delivery compared to traditional sequential construction methods. In fully pre-integrated deployments, SmartRun can be factory assembled, tested, and validated prior to delivery, helping accelerate deployment timelines and improve project consistency.

Future-Ready AI Infrastructure

The deployment demonstrates support for a range of rack power densities, from today's high-performance environments to the high-power demands of next-generation AI workloads. The modular architecture provides a scalable foundation for future AI growth while illustrating how integrated ecosystems can accelerate the adoption of advanced AI technologies.

An Ecosystem Approach to AI Infrastructure

Delivering the Centres of Excellence required close collaboration between NEXTDC, Vertiv, Castrol and SRA Solutions. Together, the partners created a production-ready AI environment combining advanced compute, liquid cooling, rack infrastructure and modular deployment methodologies. The project demonstrates how future AI infrastructure can be delivered through an integrated ecosystem approach rather than through individual technologies operating in isolation.

Conclusion

As AI workloads continue to increase in scale and complexity, liquid cooling, modular infrastructure and ecosystem collaboration will become increasingly important components of future data centre design. Through the Liquid Cooling Centre of Excellence initiative, NEXTDC, Vertiv, Castrol and SRA Solutions have created a real-world demonstration of how next-generation AI infrastructure can be deployed efficiently, reliably and at scale within Australian data centres.

> *"This partnership has been a labour of love for me and NEXTDC. Together with our partners, we've created more than demonstration facilities. We've built environments where organisations can see the future of AI infrastructure firsthand, learn from real-world experience, and gain the confidence to accelerate their AI journey. It's been an exciting collaboration from day one, and we're proud to see it come to fruition,"* ***said Robert Keegan.***

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