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Asperitas

gets under the surface of HPC in Amsterdam datacentre

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This year, Asperitas and trusted Shell partners successfully provided an infrastructure upgrade for an energy efficient, scalable and future ready High Performance Computing (HPC) cluster in a T-Systems managed Amsterdam datacentre. The cluster, which is reducing the datacentre carbon footprint as well as operational costs, was delivered by Penguin Computing and their OEM partners to offer a fully integrated and optimised solution suitable for enterprise level HPC.

Writing credit: Emilia Coverdale, Marketing Project Manager at Asperitas

As predicted, the deployment of the Asperitas AIC24 solution is meeting the demands of Shell's HPC team for efficient high-density and performance computing on both a system and server level within a sustainable datacentre environment. The installation is being managed by trusted supplier, T-Systems, IT service and datacentre provider for Shell since 2008. The Immersed Computing® technology is facilitating both CPU and GPU driven applications and offers the flexibility to easily scale with future demands and next hardware generations. As well as consuming less energy, the immersed components are running much cooler than traditional air-cooled racks and have a longer life span.

The project itself has been in full operational use over an extended period of time as a result of a pioneering collaboration between all partners involved including Penguin Computing, Gigabyte, Intel, the Shell team and the facility provider T-Systems. Commenting on its success, Maikel Bouricius, Asperitas CCO says:

> "I am delighted to see how this effort has spearheaded further development towards immersion acceptance in the enterprise market. As well as being a key driver of spin off activities, this project is a successful lighthouse installation in the Amsterdam region, where there is a strong urgency for applied innovations to meet sustainability requirements and energy challenges."

GTL fluid

This energy efficient HPC cluster is scalable for future expansion, flexible for next-generation hardware, and it meets new sustainability goals for Amsterdam. The cluster makes use of Shell's Immersion Cooling Fluid S5X, based on Shell's Gas-to-Liquid (GTL) technology providing a safe, fit-for-purpose fluid, in which the servers are fully immersed within the Asperitas solution.
The fluid was co-developed with Asperitas and is designed to reduce energy costs and emissions through its high cooling efficiency, excellent flow behaviour as well as its thermodynamic properties. The system uses natural convection to transfer heat from the IT equipment via Shell's immersion fluid to the water-cooled heat exchangers, making it much more energy efficient than using fans to transfer the heat.

> We are very pleased with the technology from Asperitas using the Shell S5X immersion cooling fluid" says David Baldwin, HPC Program Manager at Shell. "The integrated cooling solution is helping us deliver very high-end Intel CPU and NVIDIA GPU processing power to our Research and Development departments whilst also reducing our energy consumption within the datacentre itself. Continued adoption of immersion cooling within the landscape is key for our partners and customers sustainability goals and this cluster upgrade by Penguin Computing and their OEM partners is a good example of how that can be achieved.

Partner Ecosystem

Asperitas is known for collaboration with partners to develop integrated solutions and concepts that have been optimised for immersion cooling, utilising its full potential regarding efficiency, sustainability and performance. These collaborations include system integrators, datacentre operators and original equipment manufacturers.

Penguin Computing, a key partner of this effort, is the product line under Penguin Solutions known for accelerating customers' digital transformation by harnessing the power of emerging technologies in HPC and AI with solutions that span the continuum of edge, core and cloud. Penguin Computing's EIA and Tundra Open Compute Project (OCP) - based platforms enable customers to utilise immersive technologies for their HPC infrastructure and energy efficiency needs.

Sid Mair, President of Penguin Computing, remarks: "Penguin Computing is proud to have played an important role in the successful installation of Shell's new HPC cluster by delivering a fully integrated and optimised solution that meets the needs of their enterprise-level HPC application. We look forward to our continued partnership as Shell embarks on this new phase of HPC which will help discover new energy sources, drive digital transformation, and change the world's vision of what is possible."

OEM partner Intel has been focusing on investing in technologies and solutions that benefit climate initiatives and has recently announced a commitment to work with customers and partners in the development and implementation of advanced immersion cooling techniques.

> "The aim is to manage intensive workloads and have workflow processes function at the highest possible utilisation rate and availability." says Tonya Cosby, Global Enterprise Account Manager – Energy, Intel. "Our partnership with Shell, Penguin and Asperitas is allowing our team to encounter the high safety and reliability of technology for immersion cooled systems running on our combined technologies. The sustainable solution is ideal for scaling in global immersion markets."

Positive case for immersion

Shell continues to work with Asperitas as the developer of the immersion cooling fluid alongside being a valued customer, contributing to the rising adoption of sustainable datacentre cooling methods within the industry.

Research is showing that liquid cooling is gaining more interest, led by HPC and servers optimised with a large number of co-processors for artificial intelligence (AI) applications[1].

> Bouricius: "With reliability and energy efficiency being key for datacentres when choosing thermal management systems, choosing immersion ensures easy integration and proven sustainable performance. I'm confident the project will continue to create data showing the positive case for immersion for compute heavy datacentre users."

[1] Source: OMDIA | Data Center Liquid Cooling Market Analysis - 2022

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