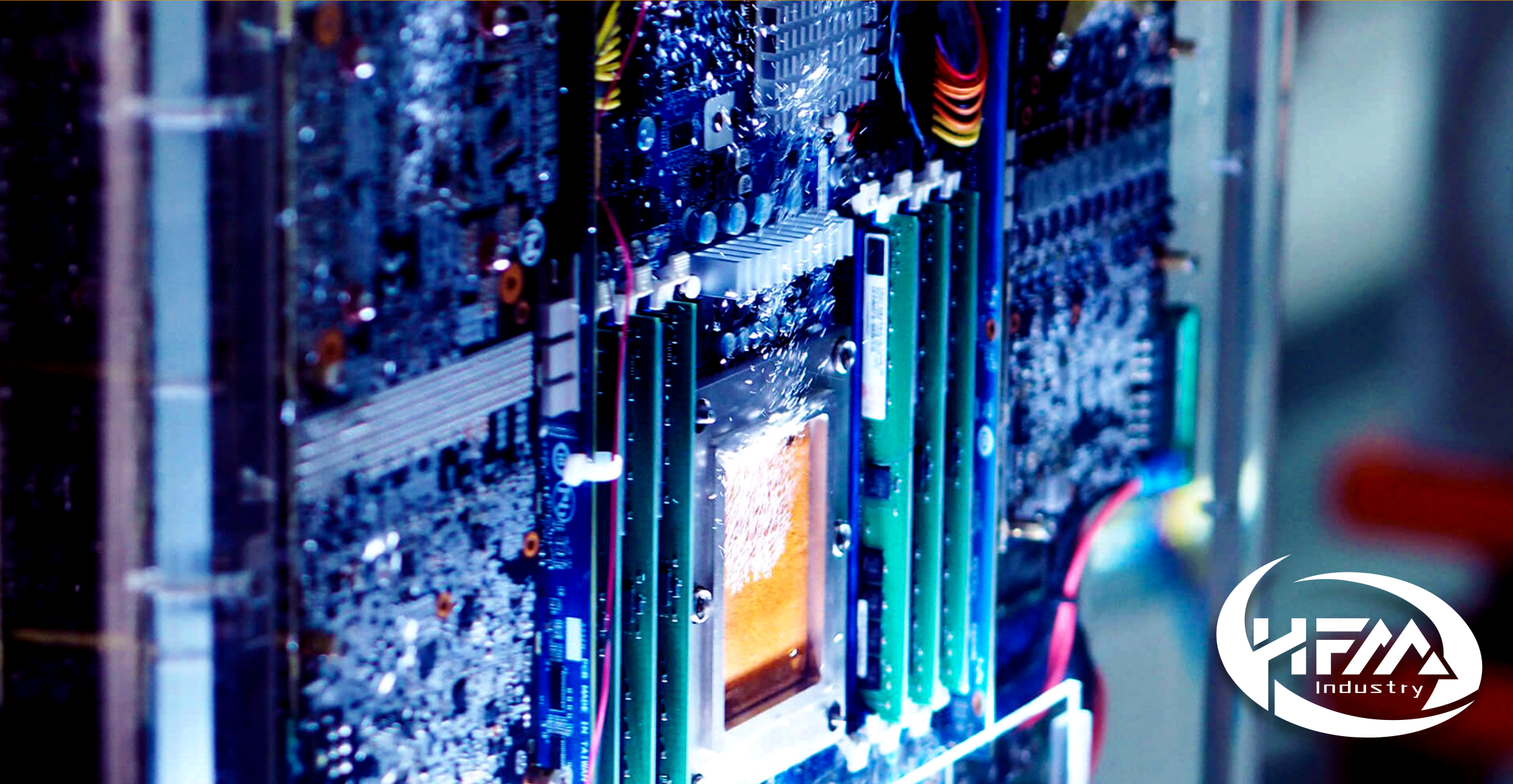


Data Center Liquid Immersion Cooling



Trend

As the AI, the VR and the self-driving industries are gaining traction. The high-density data centre market is expected to grow dramatically.

Immersion cooling enables data centres to support much higher IT densities than what is possible with air-cooled racks – by sinking servers in enclosures filled with non-conductive mineral oil.

This approach enables data centre operators to eliminate chillers, CRACs, air handlers, humidity controls, and other conventional air cooling equipment. Fewer moving parts means a lower chance of mechanical failure.

Within data centres, cooling systems must lend themselves to flexibility and scalability for reliable performance. And liquid immersion cooling may serve these purposes.

Efficiency

Air cooling and conditioning require substantial electricity to operate, while liquid immersion cooling can use warm water to provide adequate cooling for servers. Lower energy bills combined with low maintenance and high reliability lead to lower ongoing facility costs.

Geosciences company CGG uses GRC's immersion systems to cool a Houston data centre. It does seismic data processing on commodity servers with powerful GPUs that consume up to 23kW per rack. That's relatively high, but that kind of density is often cooled with air. "We put heavy compute into the immersion tanks for cooling," Ted Barragy, manager of CGG's advanced systems group, said. "But it's not so much about the application workload as the economics of immersion."

Immersion cooling replaced legacy cooling equipment in an old CGG data centre during an



upgrade. According to Barragy, the team recovered almost a megawatt of power capacity as a result of the upgrade. Even after a couple of years of adding servers and immersion tanks, “we still have half a megawatt of power we haven’t been able to use,” he said. “This was an old legacy data centre, and half the power was going into inefficient air systems.”

PUE of the immersion-cooled data centre is about 1.05, Barragy said. That’s better than another, newer but air-cooled CGG data centre in Houston, whose PUE is 1.35.

Challenge

Fluids are a key component of immersion cooling systems, carefully synthesized to ensure optimal heat transfer away from chips without conducting electricity.

And data centres vary in their age, energy efficiency, capacity, demand and other factors. To maximize cooling, operators should consider potential upgrades to older facilities and design new ones with efficiency top of mind. Using both existing and new cooling technologies can provide lower costs and higher production.

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