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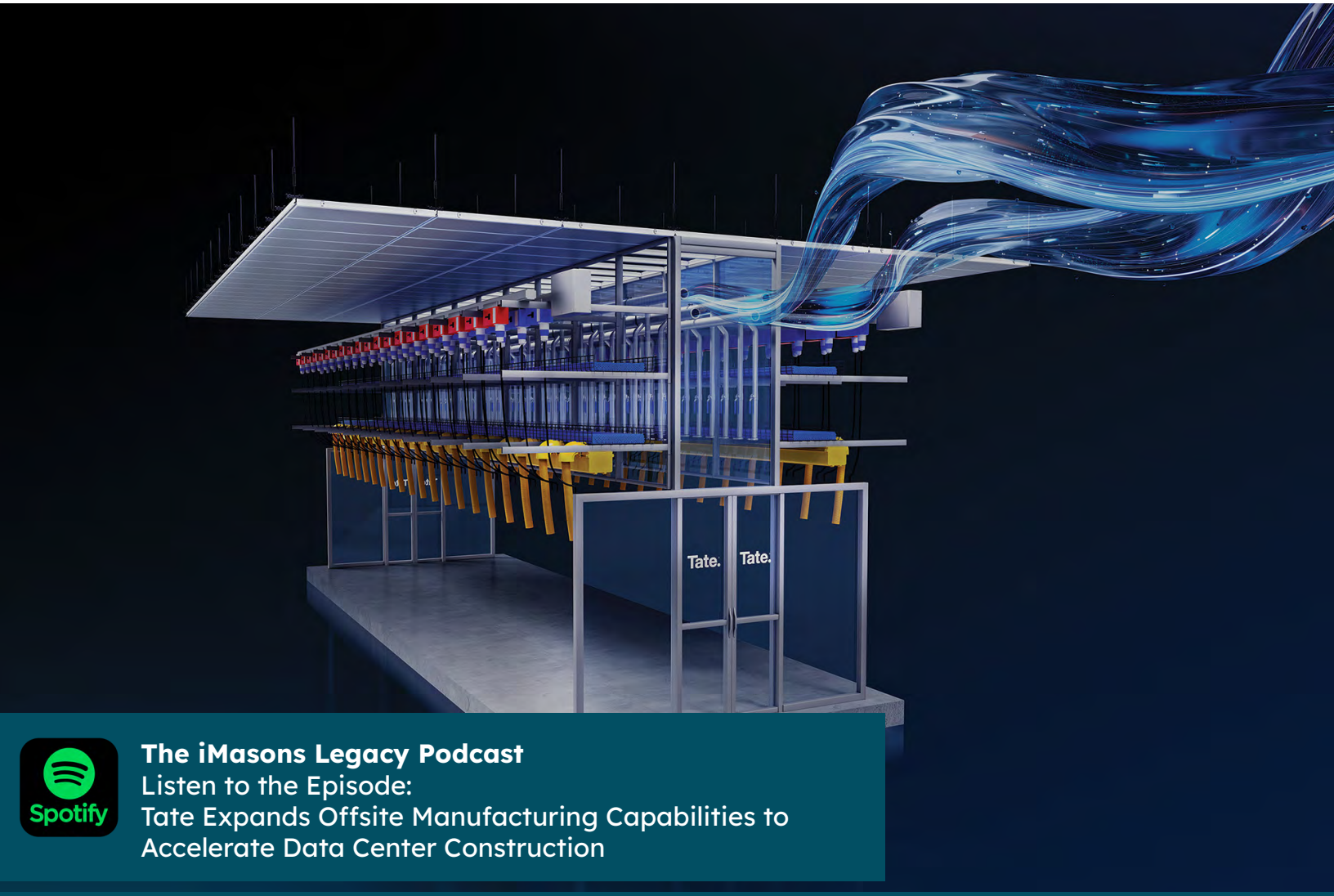
Tate Expands Offsite Manufacturing Capabilities to Accelerate Data Center Construction



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Rising Rack Densities

The pace of change in the data center industry is measured in multiples. For example, the amount of computer power packed into a rack of servers, which is expressed in kilowatts and called rack density, was 8.4 kW in 2020. Today, data centers used for artificial intelligence workloads support rack densities between 30 kW and 120 kW, with some pushing toward 300 kW, or about 35 times the average density in 2020.

The increase in rack density is driven by ever more powerful computer chips, including the graphics processing units, or GPUs, that are the workhorses of AI. The power surge in turn is impacting how data centers are designed and operated, including how the computing equipment is kept cool.

"Once you push past 60 kW, direct liquid to chip starts to become a very compelling method for heat rejection," said Daniel Kennedy, Global President of Cloud Solutions and Innovation at Tate, a leading global design and engineering data center interior solutions provider. "In the past, users could simply spread out dense compute if their data center environment couldn't support it, but many AI workloads don't allow you to spread out the load because the density is required for the type of compute you're trying to achieve."

That's why the data center industry is shifting to liquid cooling for high-density racks. Water is 23.5 times more efficient at transferring heat than air. Tate has been working in collaboration with key hyperscale and colocation data center developers to simplify the pathway to liquid cooling.

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Tate is also a leading supplier of aisle-level containment systems, which are physical barriers that separate the cold air used to cool racks from the hot air exhausted by them. This separation prevents mixing of hot and cold air, making for more efficient cooling systems. Tate's specialty is in modular hot aisle containment, or HAC, systems with fully integrated power and cooling infrastructure. These systems earned Tate recognition among key customers as the "Home of Data."

Tate's fully integrated mission-critical interior solutions, known as Konnect by Tate, are manufactured offsite and arrive at the data center ready to install and operate.

"Our manufacturing footprint has dramatically expanded to meet the demand for fully integrated Konnect by Tate HACs with manifold systems for liquid cooling," said Kennedy. "We went from a 300,000 square foot manufacturing facility when I joined Tate in 2010 to just over 2.5 million square feet of manufacturing facilities today, so about an 8-fold increase."

The pace of change in the digital infrastructure industry requires companies to be innovative and flexible and able to scale efficiently, noted Santiago Suinaga, the Chief Executive Officer of Infrastructure Masons (iMasons), a global nonprofit professional association for the builders of the digital age.

"Tate is taking an approach that maximizes efficiency," he said. "Putting all the power and cooling infrastructure onto the HAC and bringing it to the construction site ready to deploy is helping our industry move faster in a time of high demand."

Render courtesy of Tate

Tate's specialty is in modular hot aisle containment, or HAC, systems with fully integrated power and cooling infrastructure.

Offsite White Space Manufacturing

Tate's expansion of its offsite manufacturing capacity follows a trend in the data center industry toward modularization of components to accelerate construction timelines.

Infrastructure such as generators, chillers and air-handling units that occupy the so-called gray space of data centers has long been manufactured offsite, noted Kennedy. Today, modularization is moving into the part of the data center that houses the servers, storage and networking equipment – the white space.

"There is a race to dominate AI and with that reality everyone is trying to build quicker because turning it on is half the battle," he said. "So, the amount of scope Tate now manufactures in any of our global operating facilities is far more advanced than ever before."

Tate designs solutions to meet customer needs, ranging from a modular shipped-to-site format to more traditional stick build formats. All adhere to Tate's quality and on-time standards.

Offsite manufacturing also helps address the shortage of skilled labor needed to build data centers, noted Saqib Ashraf, Global Cloud Integration Solutions Director - Cloud Solutions and Innovation at Tate.

This challenge is intensifying as more data center campuses are built outside of major population centers, which requires developers to import a portion of the workforce with the mechanical, electrical and plumbing skills needed to put together a data center.

"Tate has done a good job standing up full-scale factories in areas where manufacturing has departed," Ashraf said. One of the benefits of building at any factory level is that a factory is a controlled environment with increased overall safety compared to an active construction site."

Graphic courtesy of Tate

Bespoke Solutions

The dedicated and skilled workforce in turn cranks out fully integrated power and cooling systems that are manufactured to customer specifications, Ashraf added.

For example, as the data center industry shifts to liquid cooling from air cooling, many customers require custom hybrid systems. Ashraf's team might engineer a system with supply and return branches off the manifold system for 16 of the racks, and a capped flange connection for the remaining four racks in a row for conversion to liquid cooling in the future.

"Every system is bespoke," he said, "which is the beauty of being in this industry."

Often, Tate's research and development team gets pulled into customer conversations to help flesh out ideas and concepts, build prototypes and scale designs for manufacturing, shipping and deployment, noted Sinead Lalor, Director of Sales Engineering at Tate.

For example, Lalor's team recently collaborated with a customer on a fully integrated Konnect by Tate HAC system that was too wide to fit on a truck for transport to the data center. So, the research and development team engineered telescoping and expanding arm features that allowed the HAC to be contracted for transport but maintain the fully integrated design for ease of data center deployment.

"We're constantly learning and developing," she said. "If we develop a cool feature to put into a system for a customer and it's bespoke to us, we'll patent it, and we can work it into other designs."

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Authentic Commitment

From the outside looking in, Tate's commitment to research and development, innovation and sustainability is authentic and widespread, noted Rudolf Gordon-Seymour, Director of Europe, Middle East and Africa at iMasons.

Tate is a Foundation Partner of the iMasons Climate Accord, a coalition of companies in the digital infrastructure industry that is united on the goal of carbon reductions across materials, equipment and power.

The company's lower embodied carbon, or LEC, product line reflects this commitment, noted Gordon-Seymour. These products are manufactured with materials that have a lower carbon footprint than standard materials such as steel sourced from suppliers that use electric arc furnaces and are connected to clean power grids instead of traditional coal-fired blast furnace steelmaking.

In addition, Tate was a sponsor and presenter at the iMasons Dragon's Den event on November 20 in Dublin, Ireland, which is powered by the iMasons Innovation Incubator initiative to drive progress and transform the digital infrastructure industry.

"They don't just talk about it," Gordon-Seymour said. "They do it."

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CONTRIBUTORS

Daniel Kennedy
Global President of
Cloud Solutions and Innovation
Tate

Saqib Ashraf
Global Cloud Integration Solutions Director
- Cloud Solutions and Innovation
Tate

Sinead Lalor
Director of Sales Engineering
Tate

John Roach
Writer and Content Strategy
Infrastructure Masons

Rudolf Gordon-Seymour
Regional Director, EMEA
Infrastructure Masons

Santiago Suinaga
Chief Executive Officer
Infrastructure Masons