

Unlocking Efficiency and Agility: The Guide to Modular Data Centers

[What Is a Prefabricated Modular Data Center?](#)

[Who Is Adopting Prefabricated Modular Data Centers?](#)

[Benefits of Utilizing a Prefabricated Modular Data Center](#)

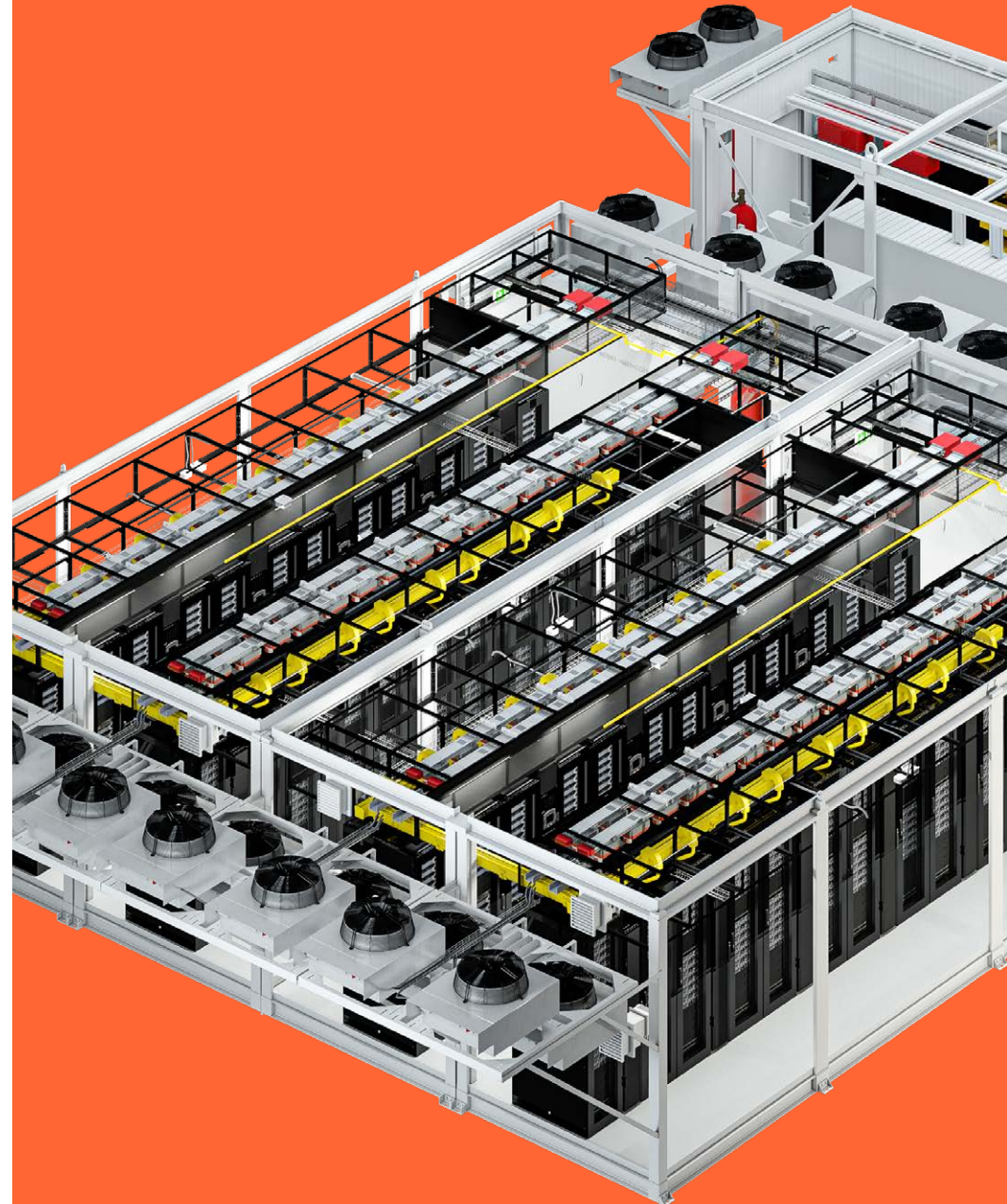
[Standardized Designs From Vertiv](#)

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What Is a Prefabricated Modular Data Center?

Over the last decade, a notable shift has occurred in data center construction methods. In the past, traditional “brick and mortar” approaches involved piecing together system components and constructing the building, followed by equipment installation and commissioning. However, in contrast, modern modular data centers are conceived, produced, and tested off site concurrently with site preparation, yielding more than 40% time savings compared to conventional builds. Prefabricated modules prioritize seamless integration, curtailing on-site labor demands and logistical intricacies.

This transition offers rapid and efficient design, augmented risk management, and cost predictability through factory integration. Modular data centers ensure scalability for future expansions, embody repeatable designs, and exhibit superior quality via factory control. This simplified assembly enables swift transportation by road, rail, or sea, contributing to enhanced deployment agility.





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Who Is Adopting Prefabricated Modular Data Centers?

[Research done by Vertiv and Omdia](#) in 2022 revealed that of 228 companies surveyed from diverse industries across the globe who operate their own data center, more than half have already deployed prefabricated modular data center solutions.

99% of participants say that prefabricated components and modular data center deployment is part of their future strategy.

93% said that prefabricated modular solutions would be their default construction strategy for their data centers in the future.

Why are these industries adopting prefabricated modular data centers?

When asked about the reasons for adoption, modularity emerged as a leading factor for scalable data center growth. This is followed by standardization to reduce maintenance expenses and enhance operational simplicity. Sustainability came in third, with modular systems primarily utilizing recyclable steel instead of concrete, which offers a lower carbon footprint during production. Furthermore, the concentration of assembly within a single location, exemplified by factory-integrated prefabricated modules, reduces shipments and subsequently lowers the environmental impact of installation.





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Benefits of Using a Prefabricated Modular Data Center

Prefabricated modular data centers offer a host of compelling advantages that are transforming the landscape of data center design and deployment. Their inherent modularity ensures scalability, allowing organizations to easily expand their infrastructure as demand grows. The standardized nature of these modules streamlines maintenance and operation, promoting efficiency and reducing costs. Additionally, the sustainability aspect cannot be overlooked as the use of recyclable materials, like steel, in the manufacturing process reduces environmental impact. By integrating assembly within controlled factory environments, these data centers not only save time but also minimize on-site disruptions, resulting in faster deployment and optimized performance. Overall, prefabricated modular data centers stand as a testament to innovation, offering adaptable, cost-effective, and eco-friendly solutions for the ever-evolving demands of the digital age.

Challenges of using a prefabricated modular data center

While there are a multitude of benefits in choosing a prefabricated modular data center, instances of transportation and logistics challenges might emerge when delivering larger modules to remote or difficult-to-access locations. Additionally, while centralized design may not always account for the nuances of local building regulations, particularly in the Europe, Middle East, and Africa (EMEA) region, additional on-site efforts may be necessary to ensure full data center compliance. Nevertheless, at Vertiv, we leverage our extensive engineering expertise and global experience to effectively address these uncertainties, ensuring the delivery of an optimal data center solution at each site.





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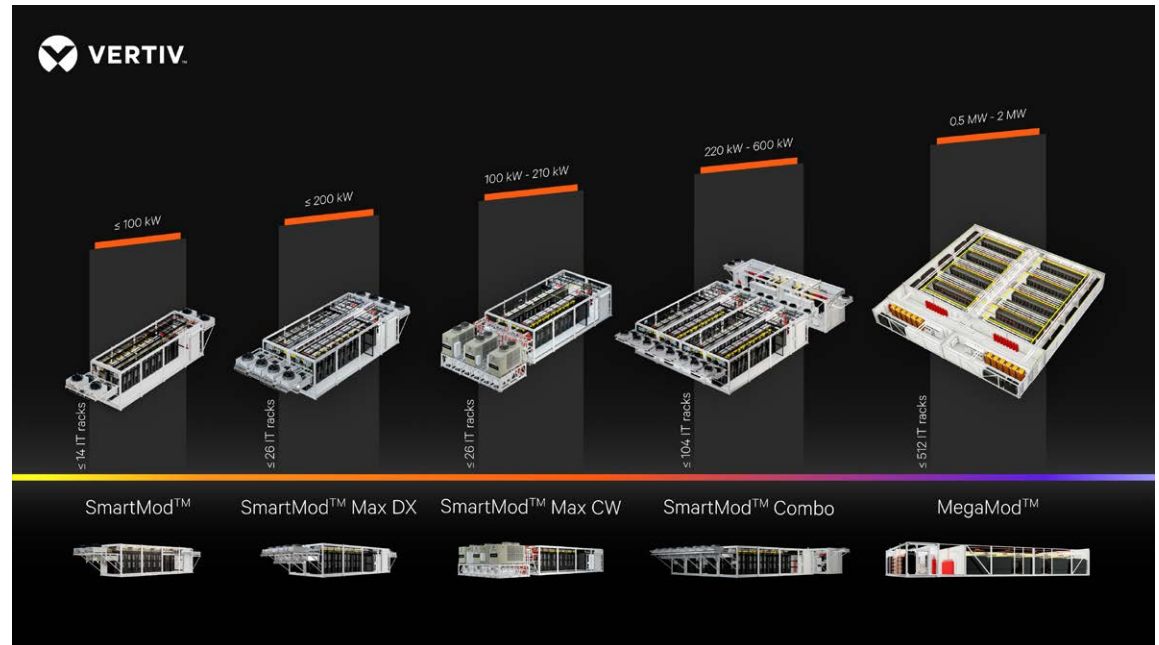
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Standardized Designs From Vertiv

Our standard data center designs include our Vertiv™ SmartMod™, Vertiv™ SmartMod Max, Vertiv™ SmartMod Combo and Vertiv™ MegaMod™, which have optimum lead times and pricing. These all-in-one data centers feature Vertiv™ power and thermal infrastructure, as well as and fully integrated racks.

Challenges of using a prefabricated modular data center

The [SmartMod](#) is a single module with up to 14 racks and up to 100 kilowatts (kW). Nicknamed the “data center in a box,” this product provides enhanced availability, efficiency, and control in a self-contained enclosure that can be deployed securely, virtually anywhere. By utilizing Vertiv’s advanced power, cooling, and monitoring technologies, the SmartMod provides scalable capacity, rapid deployment, flexibility, and portability. Unlike traditional data centers, the SmartMod can be easily moved to a new location if needed, making it a highly versatile and convenient option.



[Product specifications](#) vary based upon offering region.



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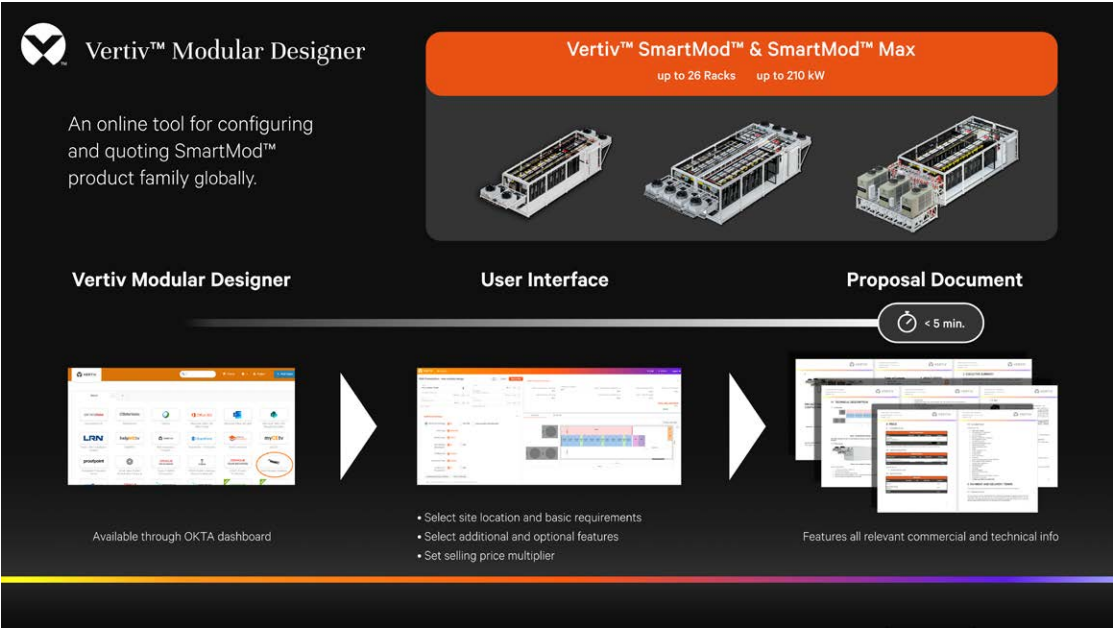
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Vertiv™ SmartMod™ Max

The **SmartMod™ Max** features two modules assembled on site to form a single space and offers up to 26 racks and 210 kW. The SmartMod Max DX features direct expansion cooling. The SmartMod Max CW features chilled water cooling.

Online Configuration Tools Provided by Vertiv

For SmartMod™ and SmartMod™ Max, Vertiv features an online configurator for our sales teams and key partners, allowing the customer to configure their modular data centers in just a few minutes with optional systems like fire detection and suppression, access control, video surveillance, monitoring, etc.



Product capabilities vary by region.





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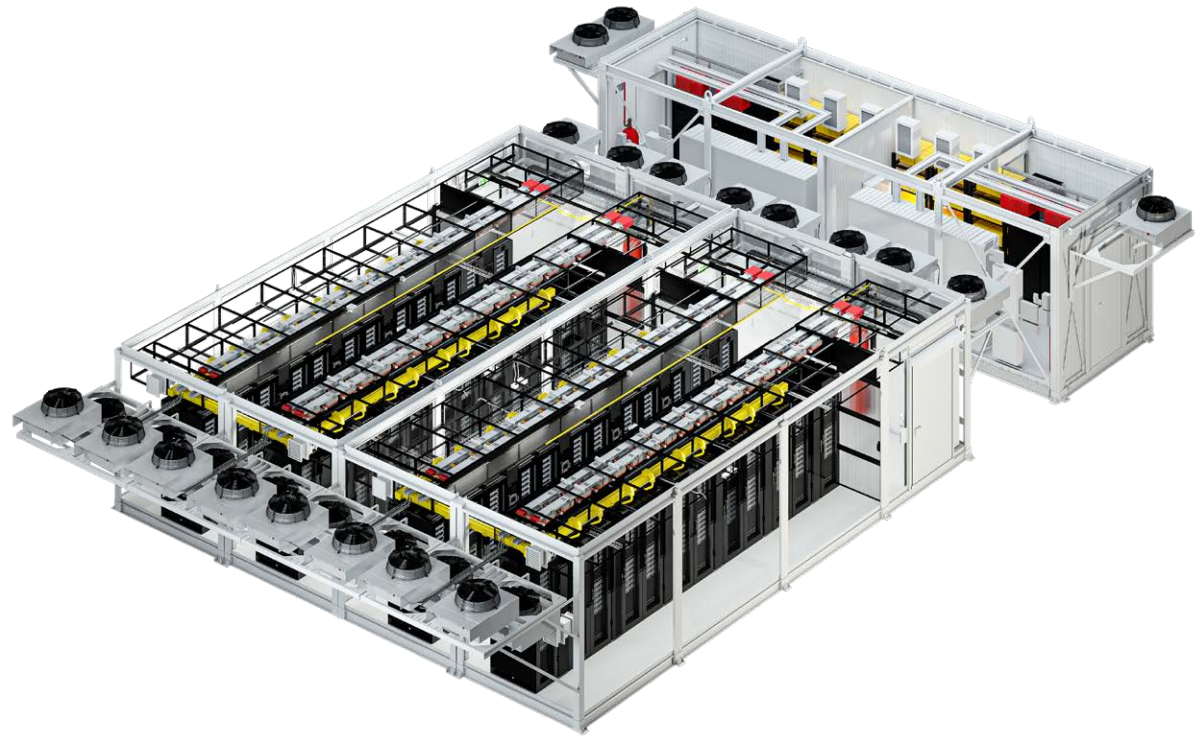
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Vertiv™ SmartMod™ Combo

[The SmartMod™ Combo](#) is a more complex multi-module solution made of two parts: the IT hall, made up of several SmartMod™ Max modules, and a separate power module. The SmartMod Combo design incorporates standardized building blocks that make up the full solution. They can be mixed and matched to increase scalability, flexibility, and budget planning. The SmartMod Combo is aimed towards IT deployments up to 600 kW and 104 IT racks.





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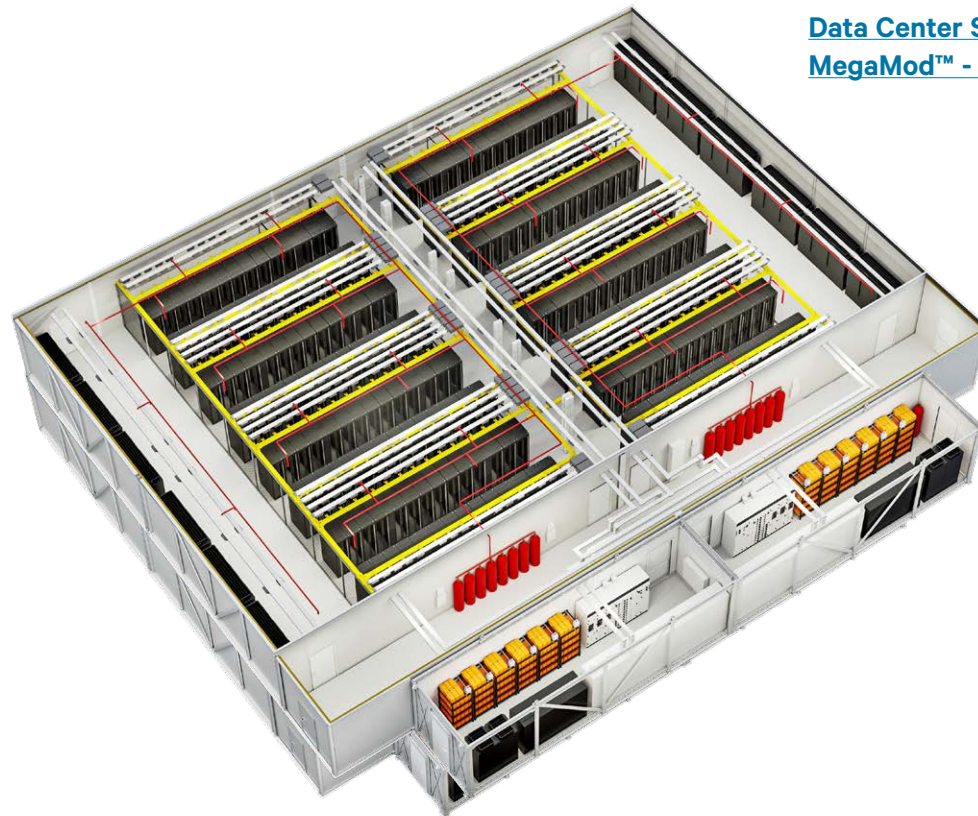
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Vertiv™ MegaMod™

The Vertiv MegaMod is a pre-engineered product platform with the flexibility to adapt to specific requirements. The MegaMod has a shorter time-to-market than traditional brick-and-mortar builds and custom modular data centers. The MegaMod supports the environmental sustainability goals of most data center owners and features a flexible pay-as-you-grow data center model, unlike traditional stick-built construction. Factory-built, this solution mitigates risk through increased reliability and resiliency.

The MegaMod is our largest standardized modular solution and is a scalable, multi-module data center that can be designed for up to 256 racks in a 1 megawatt (MW) IT space. This solution has multiple modules shipped as single units and is assembled on site. The classic MegaMod IT hall consists of multiple modules featuring IT racks and cooling equipment. The MegaMod Plus version offers up to 25% more racks and cooling capacity as it features separate IT hall and separate cooling modules. Both solutions include a service module with space for a fire system, cabling, and bus bars.

Watch video: [Scalable Modular Data Center Solutions | Vertiv™ MegaMod™ - Introduction](#)





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Hybrid Modular Approach to Data Center Design

The [hybrid modular data center approach](#) incorporates off-site prefabrication of complex building blocks (power modules/skids, cooling and hydro modules/skids, and whitespace superstructure) into or next to traditionally constructed buildings with seamless on-site integration to speed up the fit-out of a traditional build or existing data center. These are scalable, flexible designs up to 40 MW with 450 to 1,500 racks. Deployment time on hybrid modular solutions is usually 9 to 16 months, depending on complexity, with a possibility of inventory stock for rapid rollout of expansion.

Power Module Features

- Prefabricated critical power infrastructure for data center applications that are transportable by road or sea to any destination
- Module sizes that are typically up to 2,500 kilovolt-amperes (kVA) and feature an automatic transfer switch (ATS) panel and main distribution board
- Integrated Vertiv uninterruptible power supply (UPS) units with lithium-ion or valve-regulated lead-acid batteries, as well as integrated, cooling infrastructure, and auxiliary systems like fire detection and suppression
- Access control and IP surveillance
- Environmental and equipment monitoring with options such as off-site integration and testing of a transformer

Watch video: [Vertiv™ Modular Data Center Solutions – The Power Module™ Critical Infrastructure](#)





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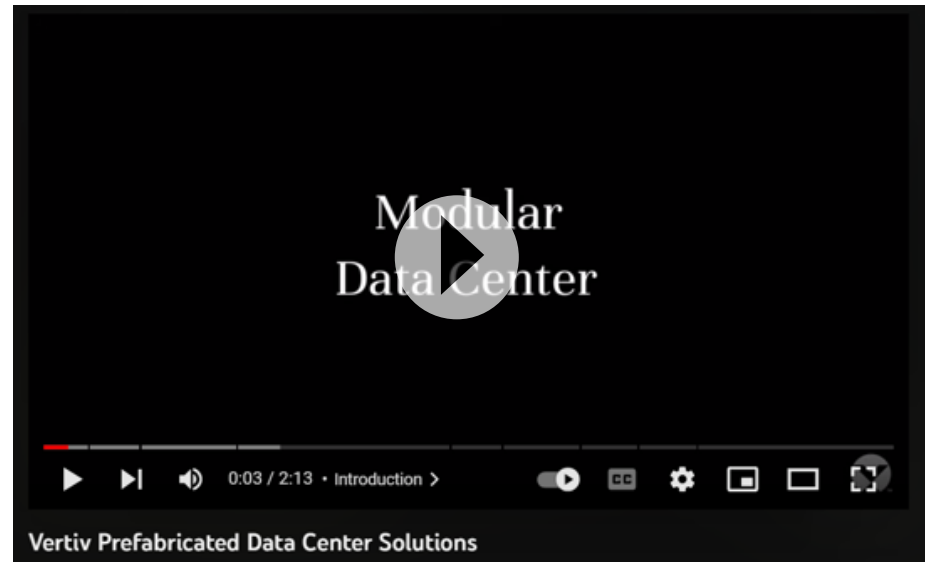
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Vertiv Custom Modular Data Centers

With customer data centers, Vertiv is able to build a prefabricated data center according to specific customer requests. Typically, these data centers are for deployments of IT loads up to 20 MW or more. Deployment time is usually 6 to 12 months, depending on data center complexity.





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Meeza: Featuring an 80-module solution and two independent modular data center buildings, this installation was delivered turnkey within 14 months, and is the largest prefabricated modular data center campus in the EMEA region.

T-systems: Built in 2013, this Tier III-certified, 1,200 square meter, 1.1 MW data center featuring 38 two-story modules was delivered six months from the initial order.

Parklands, South Africa: Initially 120 racks, this data center installation was expanded to 286 racks. Lithium-ion batteries were used for reduced operational expense. It was assembled on site and ready for testing in less than six weeks.

[Vertiv™ SmartMod™ Solution Enables Government Department to Scale Up New Edge Site Within Two Months](#)

[Big-Box Retailer Deploys Vertiv™ SmartRow™ Solution in Distribution Centers to Accelerate Time-to-Market](#)

As you can see, the modular data center industry has come a long way from “containerized data centers” and is becoming the default way to add capacity.





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In the rapidly evolving landscape of data center infrastructure, prefabricated modular solutions stand as a beacon of innovation, offering a transformative approach to design, deployment, and scalability. It's clear that these solutions provide a dynamic response to the ever-growing demands of modern technology. While challenges like customization and integration exist, they are opportunities for industry leaders to collaborate, innovate, and refine the concept further. By embracing the modular paradigm, organizations can harness flexibility, efficiency, and sustainability in their data center strategies, laying a resilient foundation for the digital age ahead. The road to the future is paved with modular components – each one representing a piece of the puzzle that, when combined, forms a comprehensive solution that is greater than the sum of its parts.

Additional Resources

To review the webinar, "The Advantages of IT Modular Solutions", [register here](#).

Also, sign up for our [Engineers Frontier Community](#) on LinkedIn.

Review our modular data center offerings on [Vertiv.com](#).



