

Big-Box Retailer Deploys Vertiv™ SmartRow™ Solution in Distribution Centers to Accelerate Time-to-Market



A Vertiv Case Study



Background

In today's challenging retail environment, few organizations succeed in maintaining long-term profitability while quickly responding to shifting consumer tastes and the online shopping boom. Major challenges such as the pandemic, supply chain constraints, and a volatile economy have made it difficult for traditional retail chains to remain in business. While many retailers have struggled in recent years, others have made the necessary adjustments to thrive and grow.

One of the leading big-box retailers in North America posted revenue of more than \$100 billion in the fiscal year 2022 and has a strong history of growth before and throughout the pandemic, enabled in part by a diverse mix of products including food, apparel, household essentials, electronics, and seasonal offerings, to name a few.

The company has grown both its traditional "brick and mortar" retail sales while its digital sales growth continues to outpace the industry. One of the drivers for this success is the company's unique ability to fulfill more than 95% of all sales, in-store and digital, from its stores.

Behind the scenes, the great enabler of this ability to fulfill customer orders is a network of 48 distribution centers. Common carriers ship merchandise to and from the distribution centers. Third-party distributors then ship food items and other merchandise directly to the retailer's many United States-based stores. As a result, most merchandise sold through this retailer's digital channels is picked up by customers at the retail store locations. This approach allows for improved product availability, faster fulfillment times, reduced shipping costs, and enables a suite of same-day fulfillment offerings.

Challenge: Rapidly deploy edge compute power across multiple distribution centers, each spanning more than 3 million square feet.

Solution: Pre-designed and pre-built Vertiv™ SmartRow™ data centers with integrated racks, power protection, power distribution, cooling, security, and remote management.

Results:

- 95% reduction in deployment time with critical infrastructure up and running within five days after delivery to the site
- \$300,000 cost savings per deployment by increasing deployment speed, reducing risk, and lowering overall planning time and expenses
- Business flexibility needed to address changing needs and enable future business growth

Challenge

Rapid data center implementation at the network edge needed to enable a new digital experience

Above all, this retailer strives to optimize the customer experience in whatever manner the customer chooses to interact. During the pandemic, this company's business model needed to evolve from in-store only to a model that included a world class digital experience. This included a new mobile shopping app, transparent inventory tracking, online ordering, in-store and/or curbside pickup, and contactless payments among other capabilities. Customers today expect this from retailers to shop more safely, get what they need on demand, and provide feedback and public commentary about the business.

To enable a world class digital experience for its customers, the retailer needed to quickly scale its data processing and network bandwidth capabilities by adding edge compute within its distribution centers. Many of the distribution centers are huge facilities that exceed 1 million square feet of floor space. Some of the newly commissioned distribution centers exceed 3 million square feet.

These evolving efforts rely on successfully implementing IT technology, software, and processes that can conveniently and cost-effectively fulfill customer orders directly from any point within the system of stores, vendors, and distribution centers. They also need to be available 24x7 to enable data transparency and highly accurate inventory tracking.

Since the distribution center fulfillment engine is one of the key drivers of customer satisfaction, modernization of facilities and technology upgrades play a critical role. For example, suppose the company's replenishment and fulfillment network does not operate properly. In that case, it could experience out-of-stock merchandise, delivery delays, or increased delivery costs, leading to lost sales and decreased customer confidence, all of which impact profitability.

To deploy a new edge data center in its distribution centers, the process historically would take the retailer anywhere from six months to one full year, or even longer in some cases. There are also other considerations such as power, cooling, and remote management, that are part of the process to support digital infrastructure. This did not leave the retailer enough time to scale its edge computing capabilities and add the digital capabilities that customers expect today from all retailers.

"This flexible, yet repeatable solution for adding computing capacity to the edge of this retailer's IT network has been instrumental to its expansion and growth, which remains a necessity for the company's continued optimization of the customer experience online and across thousands of stores."

— Alex Pope, Vice President, Global Edge Systems, Vertiv

Solution

Revolutionary Vertiv™ SmartRow™ solution delivering the required flexibility and speed

To address its operational and deployment-related challenges, this retailer reached out to Vertiv seeking a new and more efficient way to increase compute power across its massive distribution center facilities. For several years, Vertiv has supplied the company with solutions needed to power and cool each of its data centers and in-store technology.

After careful consideration of distribution center computing requirements, Vertiv proposed the SmartRow™ solution, which is a pre-engineered modular data center that greatly simplifies IT deployments and increases deployment speed while reducing risk. With capacities of up to 10 racks and integrated cooling, uninterruptible power supply (UPS), power distribution, fire suppression, security, remote management, and backup ventilation, the SmartRow enables standardization of complete micro data center configurations across multiple locations if needed.

In addition, the high degree of factory integration of these self-contained units maximizes installation speed while minimizing cost. These systems can also remotely link back to central headquarter offices or the cloud to share data easily for ultimate visibility.

The SmartRow is also equipped with application programming interfaces (APIs) for modern management and monitoring enhanced with Vertiv™ data center infrastructure management (DCIM) software. This allows for precise monitoring of both power and cooling, as well as management of built-in redundancies. For instance, if one cooling unit fails, the other unit automatically takes over to prevent unanticipated downtime and ensure that systems stay up and running until maintenance can be performed.

In addition, these units operate with variable-speed fans, which drive high energy efficiency by automatically adjusting the fan speed to load requirements. The pre-integration work is performed before delivery, and the solution can be up and running quickly thanks to a "plug-and-play" design.

The flexibility of the prefabricated Vertiv™ SmartRow™ micro data center allowed the retailer's distribution center staff to place the compute power where it was needed in the facility without having to bear the extra expense of long-distance cabling. The solution was also very easy to configure and could be adapted to the needs of each distribution center regardless of geographical location.

For instance, SmartRow units deployed in California could be configured as ruggedized units that are more resistant to seismic activity. Other units that are deployed in Florida can be configured to accommodate a higher degree of heat and humidity, while units deployed in Colorado are designed for operation in high-altitude environments. Because all of the components that make up the SmartRow solution consist of standardized parts, it was very easy to ensure rapid delivery of the systems to the various distribution center sites.



Key Vertiv™ SmartRow™ Features

1. Full containment server and network racks
2. Dedicated and redundant row-based cooling
3. Power management cabinet with pre-integrated power protection and distribution
4. User-friendly 9-inch touchscreen panel
5. Load distribution and local emergency power off (EPO) or remote EPO tie-ins
6. Integrated cable management solution
7. Emergency ventilation
8. Fire suppression and detection

Results

Reduced deployment time by more than 95%

At the time of publishing, this retailer has installed 12 Vertiv™ SmartRow™ systems across its distribution centers and is planning to roll out 12 more in 2023. Because these systems are pre-configured using proven reference designs with some slight adjustments for local requirements, the work that would traditionally take up to a year can be completed in a few days.

Once delivered, the entire setup and startup can be accomplished in five days on average. Before SmartRow™, the entire process would typically take the retailer 6-8 months. This rapid implementation of compute power in the distribution centers has accelerated the retailer's time-to-market and corresponding business growth.

Reduced cost of deployment

With a pre-assembled and factory integrated infrastructure solution, the planning and design process is very streamlined and much more cost-effective. For example, the retailer no longer needs to spend months with legal consultants, permitting, finding a general contractor, or dedicating teams of electrical and mechanical engineers to design and build a new server room from scratch. Instead, it works with Vertiv and its partners on sizing of each SmartRow solution based on the needs of each local distribution center. Then the system is manufactured and shipped directly to the site, being placed exactly where it will be installed. Instead of having a fixed data center location and linking equipment throughout the facility back to the data center, SmartRow can be deployed wherever needed. Therefore, professional cabling no longer need to string miles of conduit across the facility. Such cabling projects represented significant expense across each of the upgraded facilities.

The retailer's chosen solution greatly compresses project delivery timelines and overall cost of deployment. It enables high-speed and low-risk projects, contributing to significant cost savings.

This leader in American retail estimates that the deployment of the SmartRow solutions has saved the company more than \$300,000 per location in expenses, in addition to enabling the millions in incremental revenue that may not have been captured if it had continued using a traditional build approach.

Reduced downtime

Having a field-tested infrastructure solution delivered properly sized and designed for the local environment helped this retailer eliminate unnecessary integration guesswork and errors that can impact reliability. The solutions include built-in redundancy and infrastructure monitoring capabilities to support ongoing system availability. The SmartRow data centers also include lithium-ion battery systems, which result in much longer service life further reducing total cost of ownership and the likelihood of downtime. The solutions have proven to be so reliable that the retailer typically only needs a service technician as part of its annual preventive maintenance visit.

Increased business agility with a repeatable solution

Having a self-contained rack-based system that can be placed anywhere in the distribution center facility ensures the flexibility this retailer needs. The facilities and IT staff are no longer limited by a static brick-and-mortar data center in the front of the facility. The connection of the critical infrastructure to nearby warehouse and logistics technology also saves cabling costs and minimizes data latency. Because the power, cooling, and racks are designed as expandable modules, IT and facilities staff can easily scale up or down, depending upon the needs of the business.

Expandable Vertiv™ Liebert® EXM UPS modules, for example, can scale from 50 kilowatts (kW) all the way to 250 kW. This ability to right-size lowers initial capital expenditures and ongoing operational costs. In addition, variable speed drives built into the computer room air handler (CRAH) units automatically adjust to the cooling needs of the IT load, thereby lowering energy consumption without any human intervention. Modular lithium-ion batteries also provide all the backup power needed for utility power glitches, while improving overall system resilience, reducing total cost of ownership and ensuring continuity.

Peace of mind with responsive and expert service support

Personnel at each distribution center can count on local Vertiv™ support for solution installation. In addition, by contracting with Vertiv for yearly preventive maintenance visits, IT and facilities staff can rest assured that the critical digital infrastructure in the distribution centers will continue to operate at optimum levels.

Beyond Distribution Centers: Improving the Customer Experience Using More Sustainable In-Store Technologies

Background

With the global pandemic's stay-at-home orders driving the masses to online shopping, this retailer's leaders quickly realized that network availability was business-critical and took some important steps to fortify its critical power systems, starting in the control rooms of several store locations.

Challenge

Prior to this increased online shopping traffic, the control room of an average store consisted of multiple IT racks. An intermediate distribution frame (IDF) was also in the store supporting some point-of-sale (POS) systems. All the UPS units had lead-acid batteries that were frequently being replaced. Additionally, these IT spaces had excess cable on the ground making them susceptible to failure caused by human error.

Solution

To help eliminate potential points of failure and extend replacement cycles for UPS batteries, the IT team chose to become Vertiv's first retail customer to deploy the single-phase Vertiv™ Liebert® GXT5 Lithium-Ion UPS units, using them to support both the control room and select POS devices. This online, double-conversion UPS offers the highest level of power protection available from a UPS with lithium-ion battery technology to significantly reduce the risk of power disturbances impacting the customer experience. It also resulted in a much more compact solution, allowing the retailer to eliminate some

control room racks. The team has also deployed the three-phase Vertiv™ Liebert® ITA2 UPS units with the Vertiv™ MPL lithium-ion battery cabinets. For both solutions, the longer-lasting lithium-ion batteries reduce labor costs and support sustainability goals through reduction in the use of lead and less e-waste.

Additionally, the new architecture of the control room racks included monitored and switched Vertiv™ Geist™ rack power distribution units (rPDUs) that had custom color coding and input cord location, which aligned with specific installation and power management needs. The compact and centralized UPS and streamlined rPDUs helped this retailer's team reorganize the space and improve cable management, which helped to prevent tripping hazards and accidental unplugging of cables that could cause downtime of critical systems.

Results

By upgrading aging infrastructure to a new edge solution from Vertiv, one of the world's most iconic retail brands enabled a superior online and in-store customer experience. The retailer realized the many benefits that come from lithium-ion batteries, including fewer replacements and less waste. The longer-lasting and more lightweight battery option has also reduced shipping costs and the truck rolls required for maintenance visits, further minimizing its carbon footprint. Ultimately, the retailer was able to ensure availability of its servers and communication systems, registers, and inventory management platforms in order to meet the increased demands on its digital network.

Visit [Vertiv.com](https://www.vertiv.com) to learn more about how micro data center solutions like the Vertiv™ SmartRow™ can support your edge computing needs and help you scale with confidence.