Case Study

Retail Technology Solutions

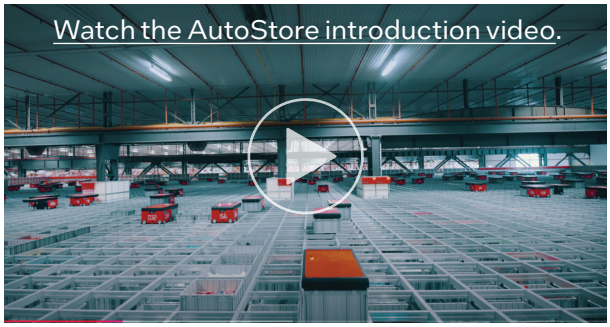
Accelerate Retail Order Fulfillment with Automated Storage and Retrieval from AutoStore

The AutoStore robotic storage and retrieval solution for warehouses, distribution centers and retail stores is built on Intel edge technology. It helps speed up order handling and reduce costs for omnichannel retail.

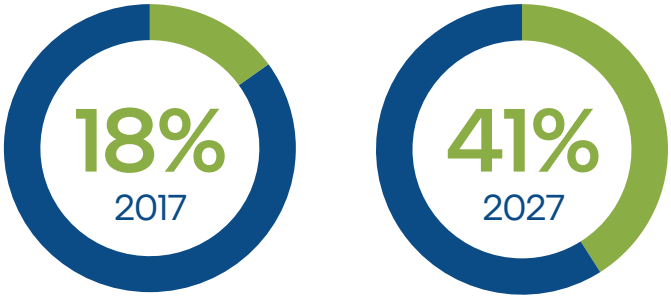
As retailers strive to optimize their omnichannel strategies, they must also meet growing customer expectations. The bar has been raised in particular by e-commerce, where same-day delivery and painless returns are common. These pressures have intensified with the shift away from brick-and-mortar retail; from an 18% share of total global retail in 2017, e-commerce is expected to reach 41% by 2027.[1] This transition corresponds to 9% compound annual growth in the e-commerce segment, compared to 4% for brick and mortar.[1]

These forces place new focus on the efficiency of order fulfillment to reduce operating costs. This factor is vital both in distribution centers that ship directly to customers, as well as for in-store fulfillment of Buy Online, Pick Up In Store (BOPIS) orders, a subsegment that is growing at an even faster rate than e-commerce as a whole.[2] In both cases, automation is central to handling more orders faster, to reduce overhead costs per order.

The AutoStore automated storage and retrieval system (AS/RS) dramatically accelerates order fulfillment, including in warehouses, distribution centers and retail stores. The robotic solution is built to be flexible and adaptable, for any size and shape of facility, helping improve customer experiences while lowering costs, across in-store, BOPIS and pure e-commerce transactions. AutoStore implementations are coordinated by a controller that acts as a traffic command center, interfacing directly with a Warehouse Management System (WMS) for inventory management. The controller is built on edge technology from Intel that scales with the solution and provides low latency for near-real-time operation.

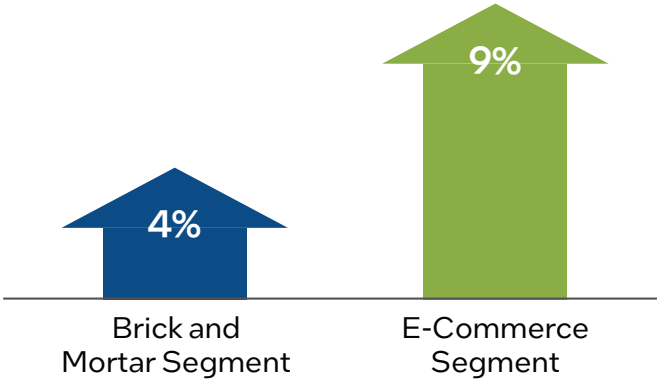


E-Commerce Share of Total Global Retail



Growing prominence of e-commerce in global retail.[1]

Global Retail Growth (CAGR) through 2027



Optimized storage and retrieval with AutoStore

AutoStore is an advanced solution for warehouse automation that improves on manual picking rates by up to 5x and increases the capacity of existing warehouse space by as much as 4x.[3] Thousands of standardized, durable bins hold up to 30 kg of stock each, stacked up to 24 bins high, with just centimeters between the stacks. High-speed autonomous robots, coordinated by the AutoStore controller node, travel along a grid made up of horizontal aluminum rails above the stacks to retrieve the bin needed for a specific order and deliver it to an operator port (workstation) for packing.

5x FASTER
order picking rates[3]

4x CAPACITY
from existing space[3]

When an operator is finished with a bin of stock, a robot returns it to the top of its stack. This workflow causes the most-often accessed bins to remain near the top, as less-often-used bins will naturally tend to migrate to the bottom. When a bin is needed from lower down in the stack, robots work together as a "pack" to move the bins above it and then replace them, further reducing retrieval time. Robots automatically charge themselves when needed, for continuous operation of the overall system.

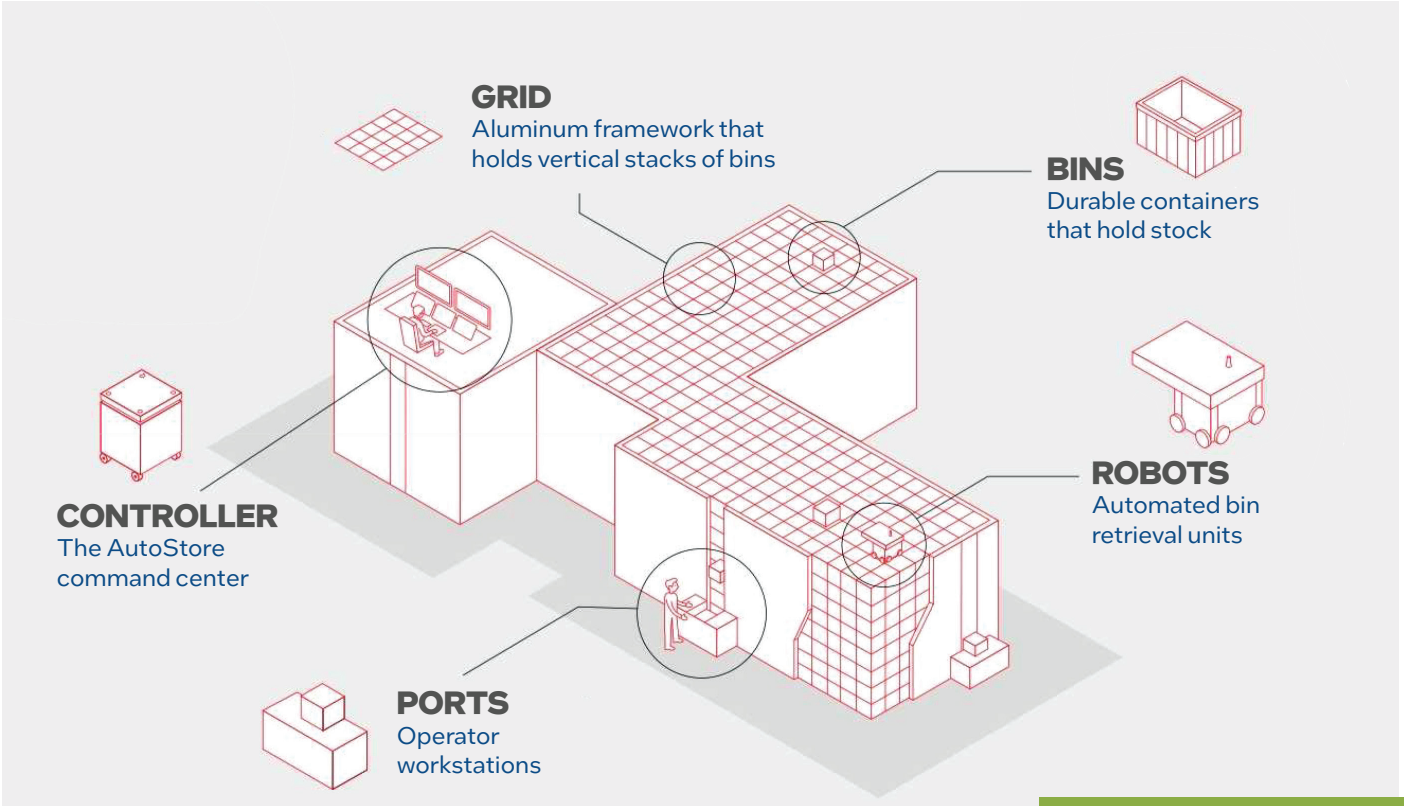
How AutoStore generates value and ROI

AutoStore robotic warehouse solutions increase operational throughput, enabling more orders or replenishment tasks to be completed per hour, in existing facilities. By eliminating walking lanes, empty shelves and wasted space, as well as the cost to heat, clean and cool the air, distribution centers increase warehouse capacity, with reduced overhead. The business also gets more value from each worker by avoiding wasted time spent walking around the facility to pick orders. Technology-driven efficiency supports business growth, avoiding requirements for higher headcount and new construction.

The modular construction of AutoStore AS/RS simplifies scaling capacity on the fly, to accommodate growth or varying seasonal requirements by extending the grid and adding more bins, robots and ports. Modularity also prevents single points of failure, contributing to an average 99.7% system uptime to protect revenue. At any scale, the infrastructure is highly energy-efficient, with 10 robots consuming about the same amount of energy as a vacuum cleaner.

AutoStore for BOPIS and micro-fulfillment

AutoStore AS/RS solutions are flexible enough for small-scale retail installations in compact locations, from the center of a store to the backroom stock area. Increased storage density for stock optimizes the use of limited space to expand product offerings while keeping sales associates on the sales floor, interacting with customers to improve the in-person shopping experience.



Components of AutoStore AS/RS.

Value and ROI from AutoStore warehouse automation.

Automated order picking at store locations reduces staffing requirements to fulfill BOPIS orders while accelerating their preparation for customer pickup. Likewise, store branches can act as micro-fulfillment centers where orders are prepared for shipping or self-service customer pickup.

AutoStore at Intel's Chandler, Arizona Warehouse

Uptime is critical for the sophisticated equipment at Intel's chip fabrication facilities, where outages equate to significant costs. To keep manufacturing operations running, Intel implemented AutoStore AS/RS, streamlining access to replacement parts for accelerated maintenance and repair.

Edge computing, powered by Intel

The AutoStore controller manages operation of the robots in the solution, guiding traffic intelligently and continually rearranging bins to accelerate order handling. To handle those tasks in near real time, the AutoStore controller processes the corresponding workloads locally, at the edge, rather than transferring data to and from public cloud infrastructure or a remote data center.

"Intel's edge technology enables cost-effective, low-latency operation for AutoStore AS/RS solutions at any scale."

– Ellen Brune, Vice President of Product Management, AutoStore

Intel architecture provides the foundation technologies for edge computing systems that host the AutoStore controller software at any scale, from hardware based on Intel® Core™ processors in store branches and small fulfillment centers to multi-socket Intel® Xeon® processor-based systems to drive the largest implementations. Utilization of Intel edge computing to orchestrate the operation of AutoStore systems provides the following benefits:

- **Fast responsiveness for robust traffic control.** Eliminating the latency of long-range data transfer enables crisp command over robots approaching real-time, to optimize traffic efficiency and raise order throughput.
- **Optimized bandwidth costs.** By processing operational data at the edge, close to where it is generated, the solution avoids the expense of large-scale data transmission.
- **Increased reliability.** Eliminating the use of wide-area networking simplifies the data path, making it more resilient to issues from dropped packets to communication outages.
- **Enhanced cybersecurity.** By limiting data transmission to internal networks, edge processing reduces the attack surface, helping protect against bad actors trying to interrupt operational continuity.

AutoStore provides Unify Analytics, a cloud-based solution for operational insights that integrates with the warehouse automation platform. A performance dashboard and reporting engine track metrics against KPIs to help identify and resolve bottlenecks and increase throughput. Unify Analytics also provides API access to supply AutoStore log data to external third-party back-office software such as data visualization, ERP and WCS systems. As back-end workloads increase their use of AI and machine learning, they will benefit from purpose-built AI acceleration technologies built into Intel edge hardware, for future-ready added value.

Conclusion

AutoStore warehouse automation dramatically improves order picking for retail use cases that range from large distribution centers to store branches and micro-fulfillment centers. The solution helps businesses get more value from both workers and facilities, with 5x faster order handling and 4x more storage per square foot of facility floor.[3] It also provides 99.7% average system uptime and the ability to scale up easily by adding capacity without downtime.[3]

Intel edge technology powers AutoStore solutions at any scale, with compute resources to power AutoStore controller nodes that range from Intel Core Ultra to Intel Xeon processors. By handling traffic control at the edge, the solution reduces wide-area bandwidth expense and improves reliability and cybersecurity. With faster, more cost-effective order fulfillment, the combination of AutoStore and Intel technologies helps retailers innovate and deliver improved omnichannel shopping experiences, for a lasting competitive advantage.

Learn more

AutoStore Warehouse Robot Technology
Intel Retail Builders Community

Solution provided by:

intel + AutoStore

[1] Boston Consulting Group, October 31, 2023. "Winning Formulas for E-Commerce Growth." https://www.bcg.com/publications/2023/winning-formulas-for-e-commerce-growth.

[2] Capital One Shopping, May 14, 2024. "Buy Online, Pick Up In-Store (BOPIS) Statistics." https://capitaloneshopping.com/research/buy-online-pick-up-in-store-statistics/.

[3] Results reported by AutoStore. See www.autostoresystem.com for details.

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