



# Robotic Automation for Order Picking

Explore warehousing trends and  
innovative GreyOrange solutions



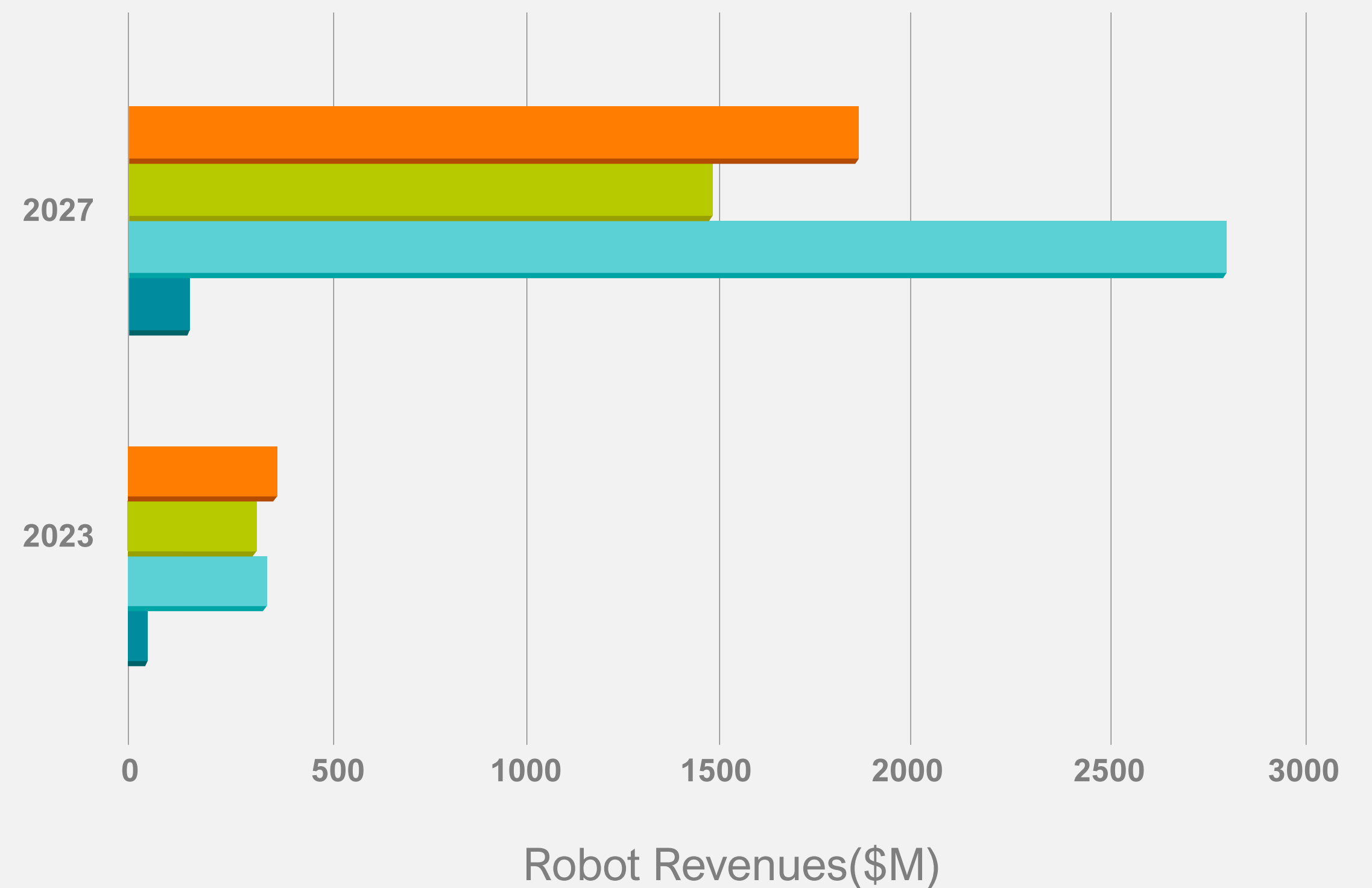
Picking and packing deliveries takes an average of four to eight hours of fulfillment operations. Best-in-class retailers are doing it in just two hours. The difference between those time frames is staggering. Even more so when you consider that almost half of consumers will shop elsewhere when delivery times are too long.

As a critical factor in the speed equation, picking improvements can help retailers leap from average to top performers. By combining automation and orchestration, companies have transformed their current picking practices into efficient processes that enable higher speed and accuracy. The gains are also prominent in improving efficiency in overall warehouse operation, including order fulfillment, inventory management, and many administrative tasks.

## AMRs for order fulfillment in EMEA and Americas

Forecast Revenues Mobile Robots for Order Fulfillment - EMEA & Americas

Shelf-to-Person Tote-to-Person Person-to-Goods Case Picking





# The Trends

Warehouse automation is a significant, growing market projected to reach

**\$41 billion** by 2027.

Still, over 80% of warehouses today need automation in place.<sup>1</sup>

Today the use of robotics adds significant value to warehouse operations. With robotics, goods-to-person warehouse systems may improve order accuracy levels to **99%** or higher while managing varied SKUs.

## Warehouse-picking automation trends

A booming online marketplace makes warehouses and warehouse operations an integral part of business for large and small companies.



### AMR-based robotic adoption is on the rise

- Highly scalable, cost-effective, and modular Autonomous Mobile Robots offer smooth integration with existing systems and work alongside human workers, improving safety and efficiency with fast time-to-value for warehouses of all sizes.



### Labor force upskilling is accelerating

- Robotics make labor workdays more efficient by reducing walking time, which otherwise accounts for **50%** of their shift time.
- With the increased use of technology, including software, robots, and automation, fulfillment centers will look to train and retain a modern workforce to arrive at a more sustainable work model, whether demand increases or decreases.



### Hardware-agnostic platform adoption is growing

- Modern fulfillment platforms that integrate multiple agents and dissolve silos will gain prominence. These hardware or robot-agnostic platforms work with different bots and human beings who interact with machines in the fulfillment process to drive seamless fulfillment across the warehouse.

**Over 150,000 picking robots will be installed by 2030, with annual shipments jumping from less than 2,000 in 2022 to above 50,000 by the decade's end. <sup>2</sup>**

# Picking Technologies

How a modern warehouse can use updated technology, including AI and robotics to reduce stress and increase productivity and profitability in the picking operations

## Collaborative bots (co-bots)

### Jobs fulfilled in the warehouse



Each Picking



Case Picking



Replenishment  
(Each or Case)



Returns Management



Cross-docking



Mobile co-bot systems(assisted picking) work alongside the human workforce to assist in picking across the warehouse. Working with humans and other fleets of robots significantly increases productivity and reduces workplace injury. It easily integrates into your warehouse and handles multi-floor operations(mezzanine ready) without barcoding.

The warehouse fulfillment orchestration platform allows bots to travel along an optimized path to multiple locations and floors to allow the correct picks & transfers at the right time. Inventory visibility and control that allows your operations to process all inventory from a single area seamlessly.

## The results

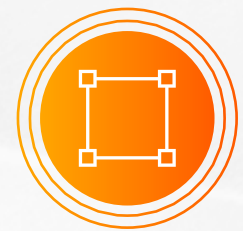
- Increase your throughput by **3-4X**
- Seamless omnichannel order fulfillment for a customer can result in **13%** higher revenue from the same customer
- Workplace ergonomics – **70%** less walking, no pushing or heavy lifting
- Meet peak demands – **High-yield** fulfillment

**3-4X increase in picking.**  
**Pick discrete and batch order, and replenish on the same bot.**



# Goods-to-person robots

## Jobs fulfilled in the warehouse



**Automated Putaway**



**Inventory Storage**



**Replenishment**



**Order Picking**



**'Each' and 'Case' Picking**



**Returns Management**



## How is the fulfillment done?

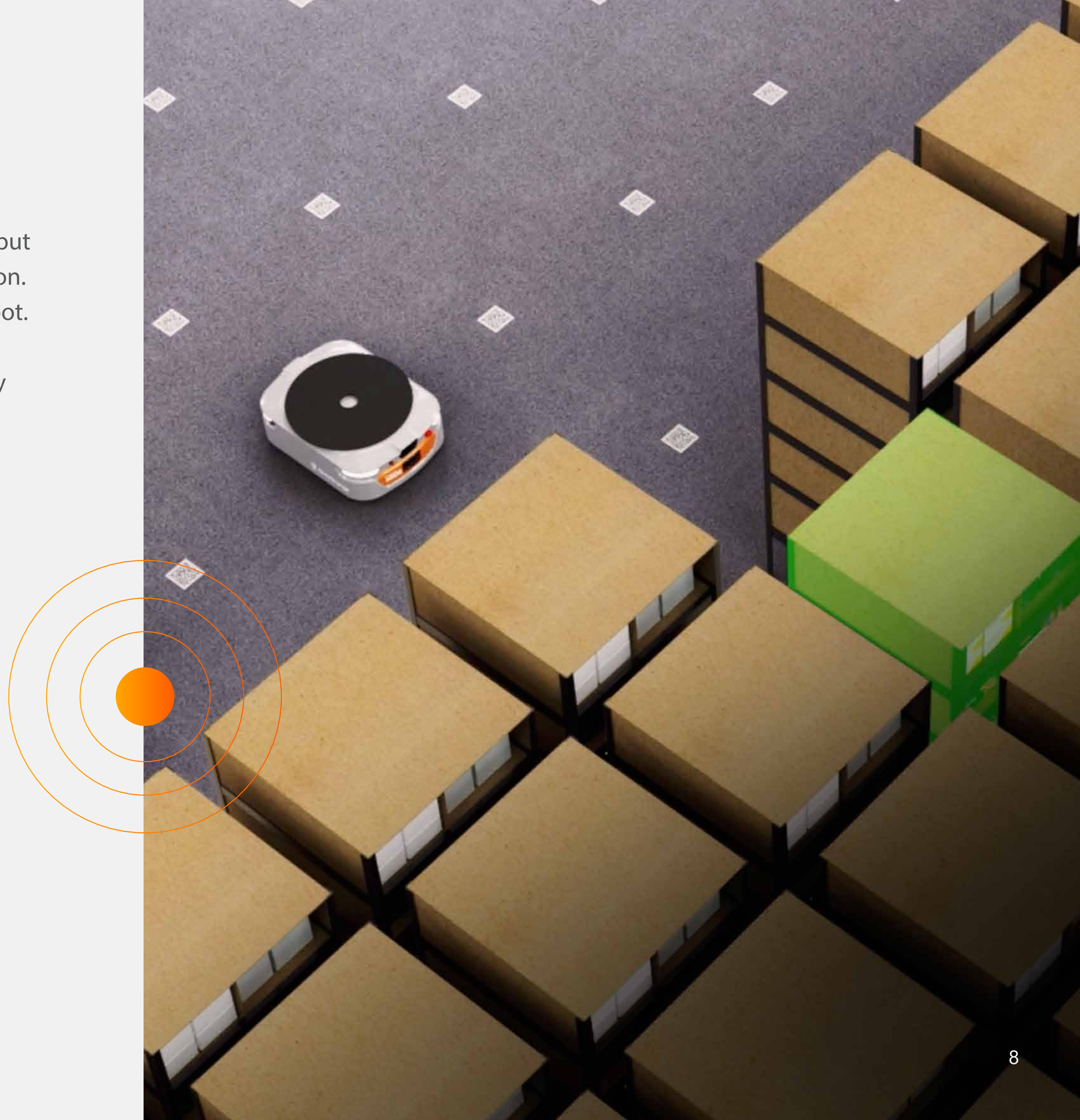
The racks-to-person bot operates with mobile storage units (MSUs), and a fulfillment orchestration platform powers the static pick-put and roll-cage pick-put station accessories. It enables efficient robots and human workforce collaboration. Additionally, the AI-powered software drives continuous improvements in the bot.

The rack-to-person automation system adapts seamlessly to changing inventory profiles, demand patterns, and peaks. Modular system architecture ensures bi-directional scalability to increase storage volume or fulfillment throughput independently by adding more storage racks or robots as needed.

## The results

- Picking productivity enhanced by **3-5X**
- Reduced travel time by **5X** that of human workers
- Reduce order fulfillment time, increase inventory efficiency, decrease days-on-hand stock

**3-5X picking improvement.**  
**No fixed infrastructure required, scale as you grow.**





# Totes-to-person robots

Jobs fulfilled in the warehouse



Case Picking



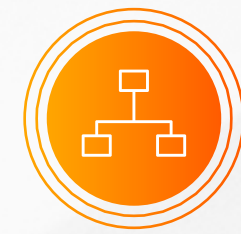
Tote Picking



Returns Management



Backstock for forward pick area



Vertical Dense Storage



## How is the fulfillment done?

This category focuses on maximizing per-square-foot utilization by leveraging vertical storage space and maximizing throughput from the forward picking zone.

Tote-to-person is a vertical autonomous mobile robot that helps in vertical space utilization or tote/carton handling applications with real-time adaptability to dynamic channel and SKU popularities. It can work with other agents to accommodate large inventory in a hybrid storage system, also helpful in micro-fulfillment solutions.

The foundational principle is to ensure flexibility in robotics to create truly omnichannel and agile fulfillment centers.

## The results

- Increased productivity of **4X** while maximizing the vertical storage area
- Can support pickers with over **500** units per hour
- Maximum picking height is **33** feet

**Increase productivity by 4X while maximizing vertical storage area**

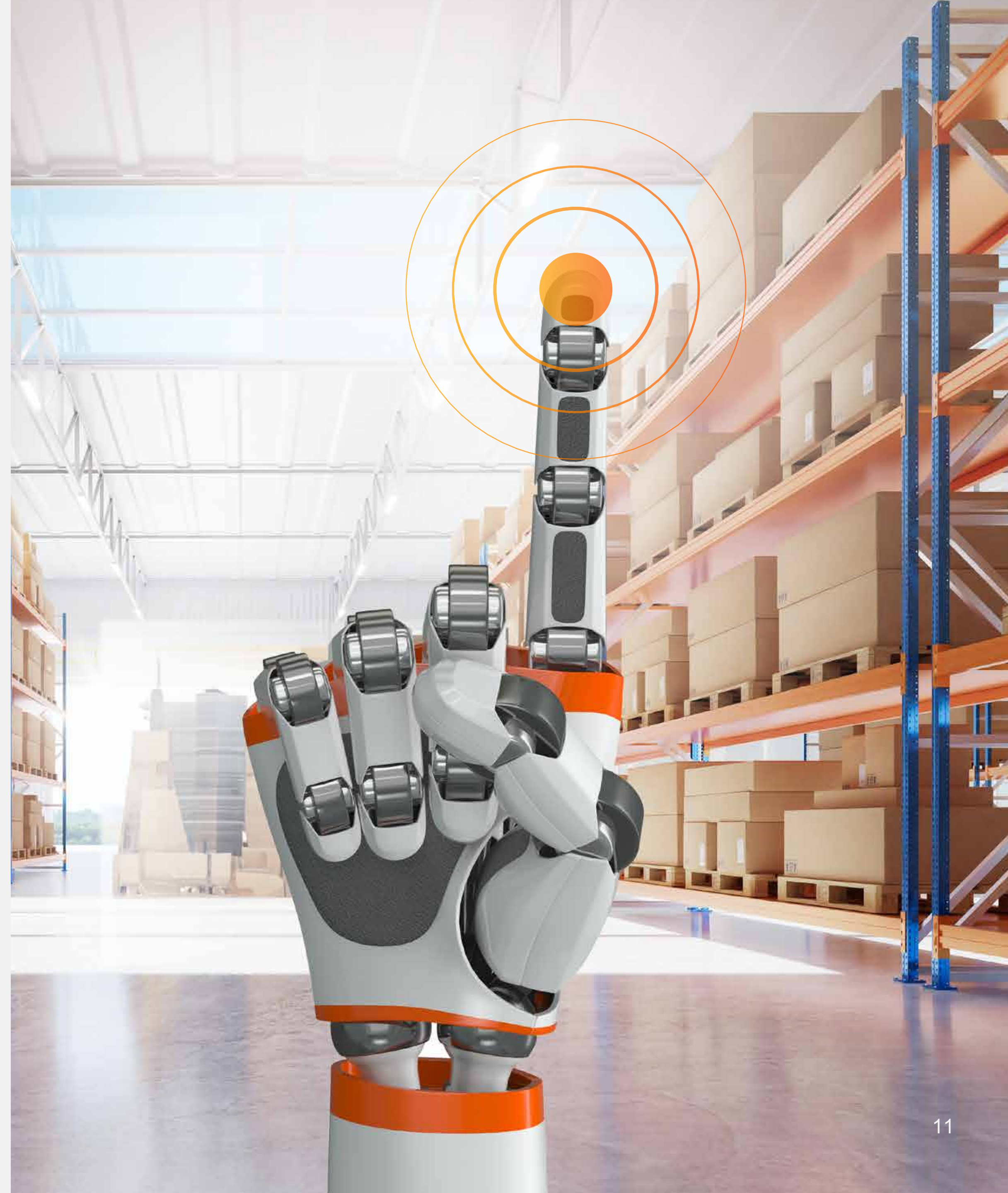


## What the future holds - A waveless fulfillment engine for picking

Traditional wave-based systems generate a fixed pick list based on a wave, limiting order batching opportunities. Thus, making it impossible to re-organize orders for optimizing picking tasks. Last-minute priority changes/cancellations take a lot of work to accommodate.

The proper fulfillment orchestration platform is a waveless real-time cost optimization engine that refreshes orders every second and picks the lowest cost/highest priority orders/tasks. It continuously solves to drive optimal decisions, efficient orchestration, and rapid execution across the entire picking operation. So, you're ready in real-time for whatever the market has in store.

Powered by AI that seamlessly integrates fulfillment software, intelligent robots, and people, it should instantaneously model the best decisions to drive optimal workflows and execution using machine learning and adaptive learning.



# Industry Recognition



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## Sources

- 1 <https://www.thelogisticsiq.com/research/warehouse-automation-market/>
- 2 <https://interactanalysis.com/insight/150k-picking-robots-to-be-installed-by-2030/>