ORCHESTRATION

The Next Frontier in Warehouse Evolution

GreyOrange

Introduction

The need for efficient warehouse operations has grown exponentially over the past few years, and in response, many companies have turned to automation.

There's no denying that automation improves warehouse efficiency and accuracy, whether it's in the form of traditional fixed automation, modern robotics, artificial intelligence (AI), IoT devices or other technologies. But, as technology continues to evolve, it has become clear that automation alone is no longer a competitive advantage. Organizations using or deploying automation need to consider three key questions.

The warehouse automation market spend is expected to reach USD 41 billion by 2027, growing at a CAGR of period after 15%[1]

1	Are you realizing the maximum potential of your automation investments?
2	Do you have the flexibility to adapt to change?
3	Will the automation you have today work with the automation you will need tomorrow?

The next frontier in warehouse automation is orchestration. **It's the difference between an automated warehouse and a warehouse that is truly harnessing the power of automation.** Warehouse orchestration seamlessly integrates various automation technologies with people and processes to drive real-time actions in a way that is intelligent, optimized and efficient.

Warehouse orchestration protects the automation investments you make today and ensures they will continue to pay dividends into the future.

This white paper explores the concept of orchestration and its potential to revolutionize the warehouse industry, covering:

▸▸ Primary challenges in today's warehouse

▸▸ Five key enablers of orchestration

▸▸ Platform capabilities that drive productivity, flexibility, scalability and efficiency

Challenges

Customers expect fast, free and seamless deliveries.

Consumer behavior has changed dramatically over the last decade. Ecommerce sales surged by **$244.2 billion or 43%** in 2020[2], as people opted to shop from the comfort — and safety — of their homes. And even as people return to brick-and-mortar stores to some degree, their expectations around immediacy, convenience and personalization have not changed.

The Amazon mindset (fast and free delivery of a nearly infinite selection of products), the influence and availability of social selling, the prevalence of smartphones and on-demand services, and the ever-expanding omnichannel experience have conditioned consumers to expect instant gratification. Today, people can shop from anywhere and have their goods delivered when, where and how they prefer.

46% of shoppers abandoned a shopping cart due to long shipping times.[3]

56% of online consumers between the age of 18-34 years expect to have same-day delivery.[4]

61% of consumers are willing to pay more for same-day delivery.[4]

Because consumer expectations are higher than ever, the retailers that can deliver economically, fast and frictionless will be the ones to survive and thrive.

The labor struggle is still real.

Along with the growth of ecommerce comes an increase in the number of warehouse workers needed to manage and fulfill orders. And as warehouses are struggling to keep up with demand, labor shortages and high turnover rates only exacerbate the issues.

Several factors have contributed to an increase in warehouse labor challenges in recent years. Since the COVID-19 pandemic, many workers are opting for safer, less physically demanding jobs or embracing the gig economy or work-from-home opportunities. And as boomers continue to retire and **global populations are shrinking,**[5] the pool of available workers is becoming increasingly limited. Many warehouses simply cannot find enough workers to fill open positions.

The warehouse and transportation industry had a record 521,000 openings in September 2022, a gap predicted to widen in coming years.[6]

The U.S. population grew just 0.4% in 2022, according to Census Bureau data released in December.[7]

## Disparate systems and developers in demand

It's not just warehouse workers that are in short supply. In many warehouses today, a piecemeal approach to automation has resulted in a siloed, rigid and less responsive architecture full of complex systems stitched together by custom code.

These systems may have many interdependent parts, and a modification to one part can affect the performance of other parts. As a result, software developers are needed to make sure all disparate systems can run smoothly.

Full-time developers are in high demand. And due to the complexity of highly customized warehouse systems, adapting to changes is a real challenge, meaning that newly on-boarded,

freelance or part-time developers often cannot meet the timelines that your business requires, resulting in bottlenecks, overworked staff, increased costs and disappointed customers.

The worldwide shortage of full-time software developers is expected to increase from

2021
2025

1.4
million

4.0
million[8]
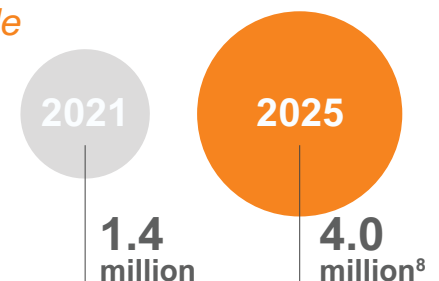
Between 2021 and 2031, the overall employment in this sector is projected to grow by 25%, much faster than average.[9]

The not-so-quick fix: traditional automation

As many warehouses install fixed automation sized to meet projected demand, a recurring complication has emerged: year-over-year growth projections simply don't suffice in today's ever-changing market. It's difficult to predict volume fluctuations for the next six months, let alone three years, leaving supply chain teams scrambling to respond to sudden demand spikes (driven by viral trends or other factors) or unplanned circumstances. These situations highlight four drawbacks of traditional fixed automation:

⏩ Lack of flexibility

Typically designed to perform specific tasks, fixed automation systems are often difficult to modify or reconfigure to accommodate changes in market demand or customer preferences.

> ***Traditional automation solutions lack flexibility to cope with the growing demand for agility in the warehouse."***
> *- "Warehouse Automation: The Pros and Cons of Fixed and Mobile Automation Solutions," LogisticsIQ, 2020.*
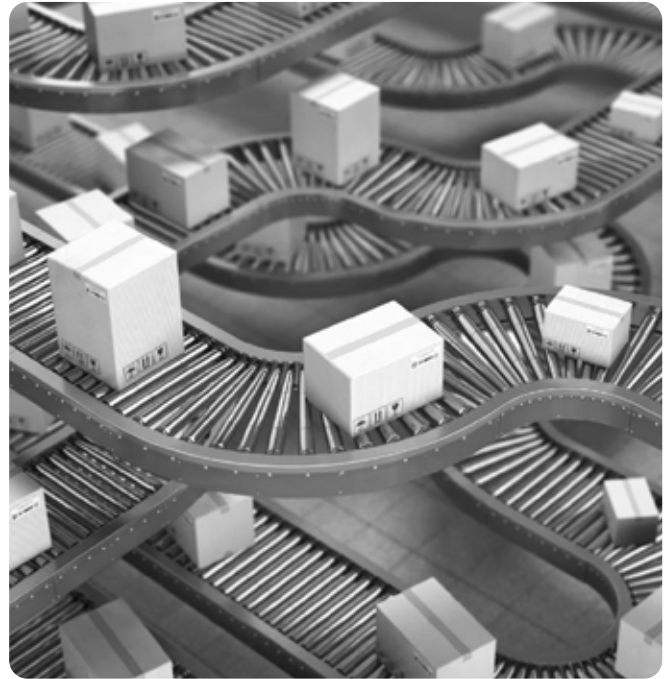
⏩ Significant upfront investment

Implementing fixed automation involves a sizeable upfront investment for both equipment and deployment costs, and it can take years to realize ROI.

> ***Fixed automation can require significant upfront investment and may have a longer payback period compared to other automation options."***
> *- "Warehouse Automation: Fixed Versus Flexible," Zebra Technologies, 2020*

▶▶ Limited scalability

Because fixed automation systems are deployed to support specific capacities, they often cannot scale to meet changing demands or growth. If order volumes exceed planned capacity, the system may not be able to handle the increased throughput, leading to bottlenecks, delays or even breakdowns.

> ***Fixed automation systems have a limited ability to scale up or down based on changing demand. This can limit the capacity of a warehouse to handle fluctuations in orders or seasonal demand.***
>
> *- "Warehouse Automation: The Pros and Cons of Fixed and Mobile Automation Solutions," LogisticsIQ, 2020.*

▶▶ Time-consuming integrations and maintenance

Fixed automation systems typically encompass many moving parts and interdependent components. As a result, custom integrations can be costly and complex, making it challenging to ensure interoperability, seamless upgrades and connectivity with other warehouse systems.

> ***Maintaining and updating traditional fixed automation systems can be complex and require specialized technical skills.***
>
> *- "Warehouse Automation: Fixed Versus Flexible," Zebra Technologies, 2020.*

Many organizations that have invested in fixed automation are now finding themselves locked into an inflexible technology stack that can't adapt to disruptive changes and demand fluctuation.

Enter the
ROBOT

To address some of the challenges of fixed automation, some warehouses are turning to more flexible Autonomous Mobile Robots (AMRs) as an alternative. Easily adaptable to warehouses of all sizes and changing warehouse needs, AMRs are a highly scalable, modular solution. They can be integrated with existing systems and work alongside human workers, improving safety and efficiency. And unlike fixed automation, AMRs require a smaller upfront investment and can be deployed quickly, making them a cost-effective solution with fast time-to-value for warehouses of all sizes.

" *Companies have found that the lower cost of capital, faster ROI and modularity of automation through robotics offer a renewed opportunity to make incremental investments that can be recouped in a reasonable amount of time."*
MHL News

" *Demand for warehouse automation and robotics is expected to grow exponentially, with the market expected to reach a value of $27 billion by 2025."*
- "The Future of Warehousing: Shifting Gears into a New Era," Accenture

Creating a foundation for automation that will work today … and tomorrow

Maximizing the ROI, effectiveness and longevity of any automation solution starts with the right software platform. Without this foundation, many warehouses end up with:

- A multitude of disparately managed subsystems
- A siloed, rigid and less responsive architecture
- A costly reliance on hard-coded integrations and lengthy custom code changes
- Automation that's inherently limited in flexibility and scalability

You can't meet modern fulfillment demands with technology built for a previous era. Today's age of immediacy requires a platform that enables the constant dynamic optimization and harmonization of every person, machine, inventory item, order and customer promise.

A warehouse execution and orchestration platform powered by Artificial Intelligence (AI) and machine learning connects discrete warehouse systems to ensure end-to-end productivity and control.

Just as a conductor unifies an orchestra so that each section works together in harmony, a fulfillment platform should seamlessly unify, optimize and orchestrate the system-wide performance of robots, humans and machines.

Continuous, end-to-end optimization necessitates five essential elements:

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GreyMatter™

INTELLIGENT

AGNOSTIC

CONVERGED

SaaS

ADAPTIVE

AGNOSTIC

As the robotic automation rollout continues to grow exponentially, many warehouses will shift from working with a single robot vendor to using fleets of robots from multiple vendors.

Companies need the freedom to choose the best-of-breed automation technologies that fit their warehouse environment, yet the interoperability and orchestration of all robots must also be a priority.

As such, warehouses need a software platform that is vendor and agent agnostic and can optimize, orchestrate and assign work to diverse fleets of robots, people and other execution agents, such as doors and elevators.

SOFTWARE-AS-A-SERVICE

Data availability on the cloud is a prerequisite to realizing value for any type of warehouse. Accessibility of that data is what unlocks true end-to-end orchestration capabilities.

A cloud-hosted platform also allows you to start from a low cost of entry and scale up or down based on the changing needs of the warehouse. Instead of upfront capital investments in infrastructure or equipment, warehouses only pay for the resources that they use.

A cloud-hosted platform also delivers regular upgrades for new features and functionality, enables enhanced security and compliance, and future-proofs your solution by ensuring that it remains relevant and up-to-date as technology evolves.

INTELLIGENT

An intelligent orchestration platform uses AI and real-time insights to continuously learn and make increasingly efficient, autonomous decisions that optimize throughput, productivity and efficiency as conditions change.

With the capability to identify patterns by extracting continuous insights across the entire ecosystem in real time, a cross-platform view of data analytics allows you to optimize and orchestrate system-wide to drive ever-increasing performance and ROI.

ADAPTIVE

Now, more than ever, it's critical to choose a fulfillment platform that:

▸▸ Boosts flexibility and scalability

▸▸ Can grow with your business

▸▸ Allows you to react to rapid changes in demand without abandoning the initial investment

▸▸ Grows at your pace, so you can deploy exactly what you need today while maintaining the flexibility to add robots and features in the future

▸▸ Simplifies your tech stack with the ability to integrate multiple fulfillment nodes, from mega-fulfillment centers to micro-fulfillment centers and dark stores

For example, your warehouse may start using cobots for picking, but over time realize more value out of those same bots by also using them for returns. Or you might take a pay-as-you-grow approach to AMRs for goods-to-person picking and eventually add more AMRs and pick stations to adapt to changes in demand.

CONVERGED

Open Application Programming Interfaces (APIs) are the key to enabling multi-agent and multi-vendor agnostic capabilities, as they eliminate the need for complex and costly integration development and transform disparate functional silos into an interconnected ecosystem of end-to-end automation.

Warehouses gain not only the ability to use the best bots from multiple vendors but also the power to leverage real-time data to make better and faster decisions across machines and people.

Warehouses generate a wealth of data, but without convergence, this data remains trapped within one of many software systems.

An orchestration platform can connect millions of real-time insights and data points generated across all automation solutions and apply those insights to make optimal decisions.

> *As a company's fleet of robots grows... Companies will need an orchestration capability that can assign work to the right robots based on near-real-time information and the characteristics of the activity. This will reduce the time, effort and cost to onboard new robots and will reduce support cost, ultimately making organizations more efficient because work will be assigned to the robot best-suited for the task."*
> *- Gartner- Predicts 2023: Supply Chain Technology*

> **You can't predict** *how your business will evolve, you can't predict the future of automation or what technology you will need…***with GreyMatter™ you don't have to!**

Today's consumers have much higher expectations than ever before, from same- or next-day delivery and personalization to connected experiences across channels. Robotic warehouse automation has emerged as a pivotal solution to address those demands, offering fast gains in discrete areas of the fulfillment process. This has encouraged organizations to add an increasing number of automated elements, but such an additive approach has led to portfolios of mixed automation from a multitude of vendors. And while each 'discrete silo of automation' may perform well, the lack of system-wide interconnection and flexibility minimizes ROI potential.

> **By 2026, over 50% of companies deploying intralogistics robots will have a multiagent orchestration platform."**
> *- Gartner- Predicts 2023: Supply Chain Technology*

To maximize performance, flexibility and ROI, fulfillment operations should consider how they unify and optimize their end-to-end automation infrastructure. A cloud-hosted orchestration software platform can provide agent (automation systems like ASRS, AMRs etc) and vendor-agnostic capabilities in the areas of end-to-end interconnection, intelligence and adaptability. And an orchestration platform that is always solving drives fulfillment that is always competing, accelerating and performing.

Don't just automate, orchestrate!

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GreyMatterTM

The GreyMatterTM fulfillment platform continuously solves to drive optimal decisions and rapid execution. Combining AI technologies with live data, GreyMatterTM provides end-to-end process orchestration to maximize warehouse performance in real time: the right order, with the right bot and picker, taking the right action. From inbound to outbound, GreyMatterTM integrates seamlessly with all existing systems and can manage any robotic agent for hybrid picking, multi-floor operations, dynamic order picking and channel-specific business rule-based fulfillment. With comprehensive business intelligence and diagnostic analytics, the GreyMatterTM command center helps customers thrive in unpredictable market conditions and drive consistent bottom-line impact.
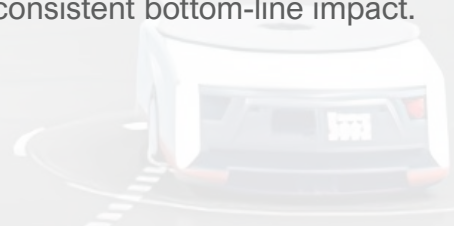
About **GreyOrange**

GreyOrange is a global leader in automated robotic fulfillment and inventory optimization software. Our line of Ranger autonomous mobile robots (AMRs) – powered by our proprietary GreyMatterTM fulfillment platform – provides hardware agnostic fulfillment orchestration that responds to customer orders in real time. Our solutions allow retailers, warehouse operators and third-party logistics companies to gain a competitive advantage by increasing productivity, empowering growth and scale, mitigating labor challenges, and reducing risk and time-to-market, while creating better experiences for customers and employees.

Gartner,Predicts 2023: Supply Chain Technology,Dwight Klappich, Christian Titze, Tim Payne, Amber Salley, Simon Tunstall,28 November 2022.

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Source:

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