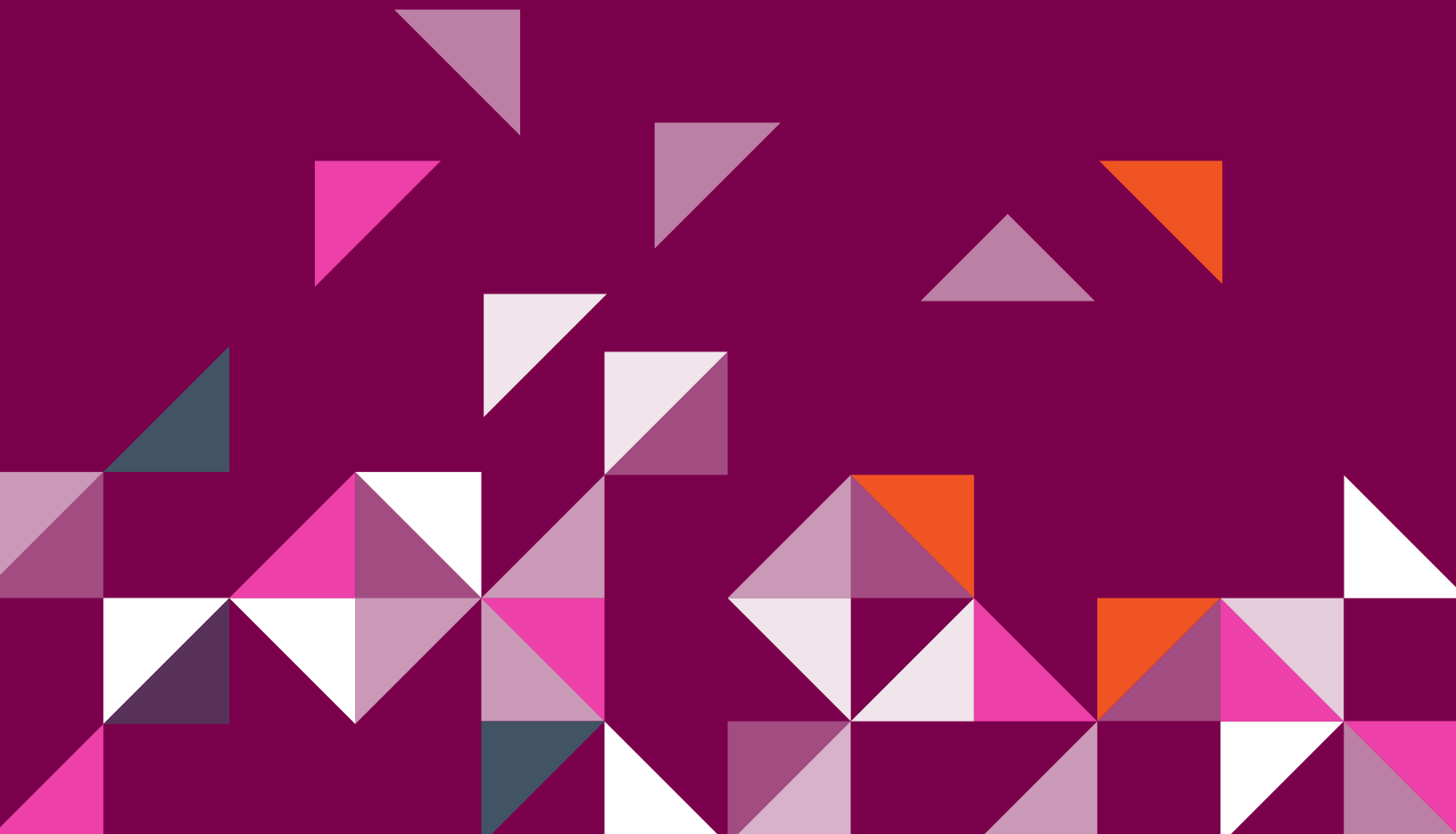




# Top Warehouse Technology Trends for 2023

How Automation Can Help  
3PLs Improve Efficiencies  
and Win More Customers  
With Less Lift



# Table of Contents

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<b>03</b>	Introduction
<b>04</b>	A Decade of Change
<b>05</b>	Why Your 3PL Needs These New Technologies
<b>06</b>	Cons of Implementing New Tech
<b>07</b>	Examples of New Automation and Warehouse Technologies
<b>12</b>	Parts on Demand
<b>13</b>	Tips to Select The Right Tech
<b>14</b>	Validating The Investment
<b>14</b>	About Extensiv

## Introduction

In an uncertain economy, many third-party logistics (3PL) companies are tightening budgets and looking for ways to work more efficiently with fewer people and lower costs. As a result, a growing number of 3PLs are choosing to adopt new technologies and implement warehouse automation to overcome these challenges.

According to the [2023 State of Third-Party Logistics Industry Report](#), 87% of respondents indicated they've implemented a warehouse management system, with other tools such as order management systems, mobile barcode scanning, and electronic data interchange (EDI), following close behind.

These new technologies are likely to reshape the 3PL industry in the coming years with innovative ways to improve efficiency and accuracy with less lift while also offering more comprehensive visibility into complex warehouse operations. The end result? More satisfied customers, decreased expenses, and hopefully, stronger bottom lines.

**The warehouse automation market is anticipated to exceed more than \$54 billion by 2030.**  
Use of robotics in warehouses will likely be one of the key drivers of this growth.

## Getting Ahead of the Curve

The 3PLs who get ahead of the tech curve and find ways to adopt and implement these new technologies are likely to gain competitive advantages over those still bogged down with tedious, manual, error-prone, or repetitive warehouse operations. These tech-driven logistics teams will be better poised to rapidly scale to meet customer fulfillment and inventory management expectations and win new business.

So, how do you get ahead of that curve to ensure your 3PL has the capabilities it needs to manage complex supply chain operations? With so many new warehouse automation systems on the market and new vendors spinning up new products to keep pace with industry changes, how do you know which technologies will bring the most benefits to your logistics operation? How do you find the right solutions for your warehouse management needs?

In this white paper, you'll learn:

- ▶ How the use of warehouse automation technologies has evolved in the past decade
- ▶ What's driving these changes
- ▶ Pros and cons of enhancing your inventory management tech stack
- ▶ What the emerging technologies for 2023 are and what they do
- ▶ How to find the best warehouse automation solutions for your needs

## A Decade of Change

While some industry leaders may have seen the rapid uptick of technology adoption as a result of the pandemic, these changes have been evolving in the industry for more than a decade. A growing number of 3PLs are using automation and robotics to handle manual tasks, which is effectively freeing up employees to focus on more complex tasks that need a human touch.

The growth of ecommerce has certainly influenced 3PL demand for technologies to tackle increased pressures of moving and storing larger amounts of inventory for more customers, while facing warehouse capacity constraints. As these ecommerce companies have more complex needs to effectively handle increased online and mobile orders, 3PLs have had to look toward technologies to help them keep up.

To maintain operational resilience in this changing marketplace, many 3PLs are embracing the cloud for more systems and applications, realizing the scalability and flexibility cloud adoption brings to the company, especially in comparison to some of the disparate, proprietary operational technologies they once relied upon.

This shift to the cloud has also opened doors over the past decade for 3PLs to make more data-driven business decisions. With increased visibility and unification of critical operational data, such as better inventory tracking and transportation management, 3PLs are learning how to utilize data analytics to drive company strategies and growth.

Ultimately, as technology adoption has increased during the past decade, the 3PL focus has been on resiliency, not just in terms of operational survivability, but also to meet changing customer expectations, everything from political, social, and environmental issues, to keeping pace with more on-demand-from-anywhere customer and consumer demands.

## Drivers and Influencers

So, why is this happening? What's led the industry to this tech revolution? Those customer expectations play a key role.

Today's 3PL customers want more visibility into their supply chain, everything from security and compliance standards for vendors, to more insight into raw materials, supply, and product inventories. They want better inventory accuracy, more consistent processes, replenishment, and deliveries, and when they have unique needs or specific requirements, they want their 3PL to respond with flexibility and offer customizations necessary to align with their goals and business objectives.

Increased customer demands driven by a growing ecommerce market is influencing many 3PLs' decisions on which technologies to implement. But doing so doesn't come without its own set of challenges.

**78% of shippers and 56% of 3PLs  
say labor shortages have impacted supply chain operations.**

For example, as logistics management companies adopt new technologies, to some degree it creates new process complexities and can introduce burdens onto staff who may not be as technically inclined as others. When teams and operations as a whole get laser-focused on trying to resolve technology challenges, they may overlook other traditional supply chain operations that need their attention. And, with the current labor shortages, it's difficult for 3PLs to recruit new employees who may be a better fit to adapt to these technological changes.

## Why Your 3PL Needs These New Technologies

For logistics companies that want to attract new customers and expand services to existing customers — while improving customer satisfaction and cutting costs at the same time — new warehouse management technologies will be the key to success.

**In 2023, more than 75% of warehouses are expected to have implemented some form of automation.**

### Task automation

Task automation will enable your teams to improve efficiencies. With real-time data insights into your warehouse and inventory management functions, you have more visibility into your overall operations, including the ability to seek out performance concerns before an incident or issue stalls — or completely halts — your warehouse operations. The more visibility you have into your operations, the more effectively you can communicate performance and expectations to your customers. You can also use this insight into your capabilities as a marketing strategy to win new business.

### More accuracy

The fastest way to lose a customer is to lose insight into the inventory you're managing for them. If you don't know exactly which materials and products your customers have in your warehouse and how much inventory is in stock, you risk not meeting their committed orders for fulfillment. If your customers can't produce or ship the products their customers want, that's likely to have a direct negative impact on their brands and reputations and ultimately your business relationship with them. Warehouse management technologies can ensure you've always got the insight you need to ensure you can get your customers exactly what they want, when they want it.

### Increase market share

By implementing new technologies, your business should be able to reduce costs and waste, and improve your customer service. With these improvements, your teams will have more time to focus on expediting your order fulfillment requirements with more accurate tracking and personalized services. When you can offer reliable, accurate services to your customer base — at lower costs with less resource utilization — it's a perfect driver to win more business and increase your market share.

### Drive higher productivity

Leveraging the most up-to-date technology and analytics can help your organization maximize labor productivity. Using tools like Labor Analytics dashboards which outline the amount of time employees spend on work by customer can provide better insights into customer-level profitability and also identify when activities take longer than expected. Business intelligence insights can rank employees by productivity and help identify which team members may need re-training or additional support to meet warehouse standards.

## Cons of Implementing New Tech

It would be remiss to talk about the advantages of these new technologies without also acknowledging they do come with some downsides. As a 3PL, it's up to you to determine if the pros outweigh the cons based on your specific business goals and objectives. Here are some of the downsides of implementing new technologies into your warehouse operations:

### Some new technologies can be expensive

For some 3PLs, it can be difficult to quantify return on investment. One report found that because 3PL contracts often range between **three to five years**, this may influence decisions about technology investments. Some companies fear that if a contract comes to an end, they won't see the full benefits of the purchased technology.

### The industry tends to be risk-averse

Many 3PLs operate on razor thin margins and often don't have in-house IT expertise, making them more careful about technology investments. With limited capital to invest on innovation, many companies will choose to shift focus on enhancing existing processes and technologies instead of taking a chance on purchasing new tech.

### Loss of human contact for customers

As 3PLs automate more services, some 3PLs fear losing human contact between their operations and customers. One report indicates that 3PLs automation of back-office tasks could result in a **97% reduction in hours and a 50% reduction in costs** for invoicing and processing, which will positively impact operational budgets, but what does that mean if you need fewer people to complete these tasks and your customers need help? Companies have to balance the benefit with having limited employee availability to directly deal with customer concerns about invoicing, billing, payments, and other issues.



## Examples of New Automation and Warehouse Technologies

So, what are some of the top emerging tech trends for logistics and warehouse management? Here's a closer look at five key categories, what those technologies look like, what they do, and how they can help you improve warehouse operations :

### Barcode Scanning and Mobile Devices

Fulfillment providers are adopting [barcode scanning and mobile scanning devices](#) to increase productivity and accuracy, while providing visibility into inventory data.

### RFID Tagging

With [radio frequency identification device \(RFID\) tagging](#), modern barcode scanners can access more data than just a SKU. These devices can help 3PLs make better data-driven decisions by providing data analytics that reflect current inventory levels and shipment requests. These devices can read barcodes individually or by batches and they can read this data at greater distances than traditional barcode scanners, increasing inventory processing speed.

### QR Codes

[Quick response \(QR\) codes](#) are increasingly in popularity because they also allow tracking of more data than just a product number, type or amount. QR codes store more data such as product name, serial and part numbers, order dates, lot numbers, and more.



**The Extensiv Solution:** With [Extensiv SmartScan](#), you can evolve your inventory operations beyond paper tickets and automate manual receiving and fulfillment tasks. SmartScan integrates with [Extensiv's 3PL Warehouse Manager](#), giving you more insight into inventory information so you can more effectively prioritize tasks for your employees. You can also use warehouse-grade scanners, retail-grade scanners, or consumer-grade scanners to access QR code data to provide a paperless experience for your staff assigned inventory tracking and management tasks.

## Internet of Things (IoT)

While IoT devices aren't necessarily new in warehouse management, they are becoming increasingly integrated into daily operations. Usage will likely increase this year and beyond:

**More than 50% of time warehouse employees spend in a warehouse is related to order picking travel.**

### Connected Logistics

Connected logistics technologies are all about insight. For a 3PL to effectively manage everything happening inside its warehouses, it needs comprehensive insight into every element, in real-time. Traditional software often siloed this data, creating blind spots that could cost your business time and money. Connected logistics ensure you always see the big picture and can address performance gaps as they arise.

### Automated Picking Tools and Voice Automated Picking

Automated picking tool adoption will likely continue to increase as 3PLs seek cost-effective ways to improve accuracies and efficiencies while speeding up processes. These tools automate the ability to locate goods and prepare them for shipment. As technologies evolve, voice picking, which uses smart headsets to help staff more quickly pick and select items, will likely become more integrated into operations this year.



**The Extensiv Solution:** With Extensiv 3PL Warehouse Manager, you can facilitate order picking as part of your WMS by facilitating when and how your employees pick orders and remove inventory based on those orders. Warehouse Manager supports guided order pick, non-guided order pick, and wave picking. And, since the cloud-based warehouse manager can seamlessly connect with your customers' systems, you'll get more visibility and control of IoT requirements to avoid costly blind spots within operations.



## Reporting, Analytics, and Computing

Reporting, analytics, and computing are transforming how 3PLs manage logistics. Utilizing [big data and analytics](#), logistics companies can more effectively see, understand, and use data throughout operations to make better business decisions.

### Advanced and Predictive Analytics

[77% of businesses](#) say they're serious about automating warehouses with WMS and other automation to maximize data-driven performance. Adopting technologies that facilitate data dissemination and analytics will be increasingly important for 3PLs that want to remain competitive, improve customer satisfaction, and attract new customers.

### Real-time data visibility

Instead of flipping through clipboards of paper manifests, orders, invoices, and receipts, WMS solutions that offer real-time data visibility will be critical to 3PLs success and evolution. Software tools that streamline data flows and access—and display it in easy-to-understand ways — can help your 3PL better manage your inventory, keep your customers happy, and decrease costly errors and mistakes.

### Blockchain, AI, and Machine Learning

[Blockchain](#) technologies are distributed databases that help share information within your business operations. While blockchain, artificial intelligence (AI), and machine learning tools are still in their infancy in warehousing, all three will help logistics companies get more insight into their data, understand how data analytics can drive business, and even get predictive insight into trends and challenges so you can address them head-on, especially related to complex supply chain management.



**The Extensiv Solution:** With Extensiv's [Business Intelligence and Labor Analytics](#), you can run 60 out-of-the-box reports and see live analytics in an easy-to-understand dashboard so you can make better data-driven business decisions. Extensiv's data analytics tools ensure you have insight into your inventory turns, stock status, customer pricing, freight audits, and more. These tools can help you more effectively monitor daily operations, track productivity, increase profitability, and win more customers.

## The Rise of 4PL Fulfillment Networks

As technology and automation play a greater role in warehouse management, many 3PLs are shifting to offering **fourth-party logistics (4PL)** services. As warehousing demands increase, especially for ecommerce customers that may be geographically distributed outside a 3PL's warehouse locations, some 3PLs are partnering with other 3PL warehouses to meet those needs. Warehouse management systems (WMS) play a critical role in the 3PL's ability to manage customer relationships, while having continuous insight into transportation, warehousing, and distribution needs.

**The adoption of cloud-based warehouse management systems has increased by 50% in the past two years.**

### Cloud-based WMS

Instead of relying on on-site warehouse management systems, a growing number of 3PLs are implementing cloud-based warehouse management systems (WMS). They offer more advantages to the 3PL over traditional on-prem inventory management systems, including cost savings, and more flexibility and scalability as customer needs change. Additionally, they are more easily extensible for building 4PL networks and connecting with other partner warehouses leveraging the same WMS.

### Order Routing and Order Bots

Order routing and order bots provide key connectivity required for 4PL Networks with defined custom business rules that handle many key tasks related to order fulfillment. These bots take cues established by your company to activate tasks when specific requirements are met. For example, you can tell your system to automatically select which warehouse (yours or a partner warehouse) to ship product from based on inventory availability, geographic proximity to consumer, and shipping cost.

### 4PL Billing

To maintain control and billing accuracy, new 4PL software can provide full visibility to your customers' inventory, order, and transaction data across all 3PL warehouses (owned or partner warehouses) - all in one place - without duplicate entry or complicated integrations. This allows for a single invoice covering all 4PL network warehouse transactions.



**The Extensiv Solution: Extensiv's Network Manager** will enhance your capabilities to expand warehouse capacity and scale your network to serve more customers like never before. Network Manager has all the tools you need to manage customer relationships and their fulfillment needs in your network of geographically distributed 3PL warehouses. The system can give you visibility into everything from inventory and orders to transaction data across all of your warehouses, all in a single dashboard. And, maybe best of all, you can more effectively manage operations and save time and money by eliminating duplicate entries or working through complicated integrations — all while setting and achieving your 4PL expansion goals.

## Robotics and Physical Automation

While many 3PLs have already found ways to integrate robotics and other physical [automation](#) tools into warehouse management, more accessibility and affordability is likely to drive more implementation in 2023 and beyond. These technologies can take on complex tasks such as picking and packing orders.

### Autonomous Mobile Robots (AMRs)

You can use [AMRs](#) for heavy-lifting within your warehouse, from moving pallets and shelving to stocking shelves without human assistance. These robots can also load and unload trucks and sequence inventory movement within your facilities to increase efficiencies.

### Automated Guided Vehicle (AGVs)

You can preprogram [AGVs](#) (for example, carts, forklifts, or towing devices) to move goods within your warehouse by controlling key elements such as navigation and deployment locations and times. They're usually guided by strips or wires within the warehouse floor so they know where to go.

### Collaborative Robots (Co-bots)

Co-bots are becoming more common in warehouses. These bots don't replace your employees, instead they interact with them and take on manual, repetitive tasks so your employees can focus on other responsibilities. Using machine learning, co-bots can increase function efficiency and accuracy the more they're used.



**The Extensiv Solution:** Extensiv product experts provide [technical consultation](#) for custom projects that require deep industry, logistics, product, and software expertise.

Subscribe to our [Developer Enablement Services](#) and receive top-level technical consultation, SLA-driven Application Programming Interface (API) resources, live support, and sandbox access for all your custom API integration programs. Our team of technical consultants can also take on any project, whether it is integration with a proprietary system or new robotics technology.

## Honorable Mention

### Parts on Demand

While not on the list of top emerging technology trends, don't overlook the role 3D printing is likely to play in warehousing in the near future. 3D printing may revolutionize the way 3PLs handle goods and materials. While in early stages, some logistics companies are finding innovative ways to print parts on demand for their customers, without having to worry about traditional delays often experienced within the supply chain ecosystem.

Well-known logistics company DB Schenker announced in late 2022 that it was the "first global logistics provider to offer spare parts delivery via 3D printing." By virtualizing warehouse replenishment operations, the company hopes to decrease delivery expenses while shortening delivery times. "The aim is to avoid unnecessary warehousing and to make supply chains even more stable and flexible," the company CEO announced in a press release.

The release also indicated the company's pilot projects included mechanical engineering, automotive, and rail transport industry materials such as handles, housing, and cladding, which were produced on demand near customers.

While not highly adopted by 3PLs at this time, this trend is our trend to watch for the future.



## Tips to Select the Right Technology

With insight into the top warehousing technology trends, you may be wondering how you choose the right solution from the right vendor to ensure your choices have a positive return on investment.

Here are 10 tips that may help:

1. Ask and answer these key questions:
  - a. What are your current business challenges?
  - b. Are you looking for an on-prem or cloud-based inventory management solution?
  - c. What are your existing inventory management policies?
  - d. Which additional features do you need that would help you more effectively run your business?
2. Look for a solution that offers all of these important features:
  - a. Inventory tracking
  - b. Barcoding
  - c. Data analytics and prediction
  - d. Ongoing order management updates
  - e. Integrations with your favorite systems and applications
  - f. Affordability
  - g. Ease-of-use
  - h. Quality customer support from the vendor (onboarding, training, and technical support)
  - i. Scalability and flexibility
3. Build a use case: What do you need to achieve to find value in the investment? Consider using an [ROI calculator](#) to determine return in advance of your investment.
4. Identify key performance indicators (KPIs) your investments can help improve.
5. Get executive and key stakeholder support.
6. Talk to industry peers about WMS they use and read product and vendor reviews.
7. Narrow your selection.
8. Schedule product/device demos.
9. Include team members that will use/be impacted by the technology in the demos.
10. Choose the solution that's right for you.

For more information on how to evaluate WMS software, download the [Software Evaluation Guide](#).

## Validating the Investment

As warehousing and automation technologies continue to evolve and more 3PLs understand where benefits outweigh risk, more fulfillment providers are likely to embrace emerging technologies today and in the future.

**23% of 3PLs report a 50% growth in order volume after implementing a WMS.**

3PLs who remain apprehensive about these innovations are likely to get left behind in an increasingly competitive market. By implementing a warehouse automation solution, your company will be able to scale to keep pace with industry changes, reduce costs, attract more customers, and increase your bottom line. Stay ahead of your competition by investing time into the research, benefits, and technology investments modern 3PLs need to improve warehouse workflows and keep your customers happy.

## About Extensiv

Extensiv is a visionary technology leader focused on creating the future of omnichannel fulfillment. We partner with warehouse professionals and entrepreneurial brands to transform their fulfillment operations in the radically changing world of commerce and consumer expectations. Through our unrivaled network of more than 1,500 connected 3PLs and a suite of integrated, cloud-native warehouse management (WMS), order management (OMS), and inventory management (IMS) software, we enable modern merchants and brands to fulfill demand anywhere with superior flexibility and scale without painful platform migrations as they grow. More than 25,000 logistics professionals and thousands of brands trust Extensiv every day to drive commerce at the pace that modern consumers expect.

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