



The
Cascading
Benefits of
Multimodal
Automation in
Distribution
Centers

voxware 
Profit from a Smarter Supply Chain





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Profit from a Smarter Supply Chain

Each step a product takes through a distribution center is influenced by its preceding steps – when executed effectively from the start, there is a cascade of benefits to all other parts of the operation.

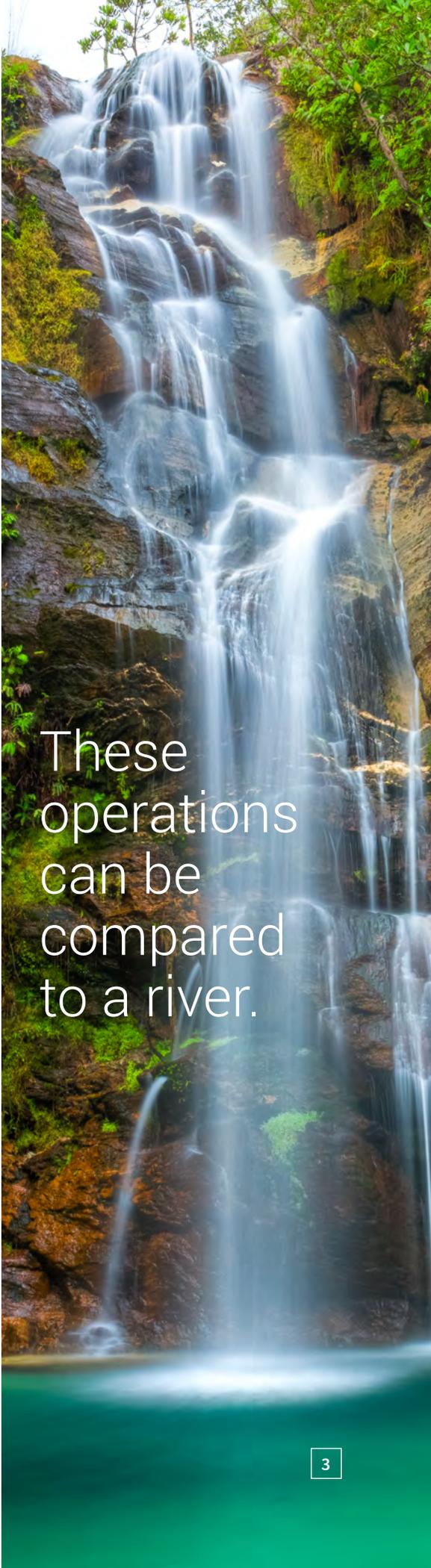
- When **receiving** is done right, it sets up success for put away and replenishment.
- If you do **put away and replenishment** right, it improves inventory accuracy at the picking location.
- When you get **picking** right, it reduces errors and delays and sets up success for packing/loading.
- If you get **cycle counting** right, you maintain a high level of inventory accuracy that drives down pick errors and increases efficiency.
- When you get **packing and loading right**, your customer gets the right order on time and you earn customer loyalty and boost brand reputation.

With apologies for adding yet another business metaphor to the pot, these operations can be compared to a river. Starting high on a mountain (receiving) and flowing along its path as it cascades down a series of waterfalls (put away, picking, packing/loading, cycle counting), gathering power with each step before reaching its ultimate destination at the big blue ocean (shipping).

All the interrelated functions in a distribution center operation are integral to one another, enabling the timely movement of accurate material safely to its ultimate destination. The momentum of this flow increases at every step and by achieving seamless operations and accurate progress at every point in the process, you are maximizing results for your company and your customers.

If a rockslide were to crash into our metaphorical river, it would back up or divert the flow off course from the subsequent stops below. Such proverbial disruption happens regularly in distribution centers when the appropriate attention is not afforded to individual steps of the process.

Distribution centers have multiple automation modalities at their disposal, such as voice, scanning, vision and image/video capture to avoid such calamities. These multimodal solutions ensure that sporadic stops of the river need not be detrimental to the flow of the entire ecosystem. Furthermore, the use of advanced analytics is making this process even more seamless, ushering in a golden age of productivity, accuracy and efficiency.



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The river starts at receiving



Picking – while obviously a step of the utmost importance – all too often becomes a myopic focus of automation improvements while earlier distribution center functions are overlooked. Receiving, the headwaters of distribution center efficiency, is too often neglected, guaranteeing problems downstream.

The emphasis on picking is understandable, as it is the function comprising the highest number of employees in the distribution center. However, one of the biggest impacts to picking success (even if enhanced picking solutions are being utilized) stems from mistakes that occur at receiving and put away/replenishment: inventory placed in an incorrect location will result in inventory accuracy problems during picking.

Some examples of multimodal benefits in receiving include improved accuracy with voice as well as the ability to scan and image capture serial numbers, measurements and notes.

It bodes well for industry performance that Voxware is seeing increased commitment to optimizing the receiving process and this understanding has worked its way onto the list of distribution center best practices.

Optimizing the receiving process has worked its way onto the list of distribution center best practices.



A place for everything and everything in its place – put away and replenishment



Following optimizations in receiving, the benefits cascading into put away and replenishment become apparent.

Using multimodal technology in put away and replenishment allows distribution centers to prioritize tasks, batch multiple tasks, avoid shorts and skips, perform added verification for 100% accuracy and identify pallets or products.

By way of example, Voxware is implementing multimodal solutions for a company facing significant inventory management challenges.

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Their existing process involves employees haphazardly finding an open location for products, writing a note of where it has been placed, walking to a computer station, inputting the information, printing a label and finally walking back to affix the label to the product location. Beyond being inefficient, this process also presents many opportunities for human error and is a direct cause of the substantial accuracy deficit they are facing in picking.

The Voxware VMS solution being implemented automates receiving and put-away. The enhanced system allows the employee to scan and capture a location, record quantity, then scan the SKU for validation at the put. In those series of actions, the location, quantity and SKU are sent to the warehouse management system as an immediate update.

By addressing the time spent getting the item to the correct location and the fact that it is inventoried correctly, the benefits cascade down and establish picking proficiency for success.



The aforementioned example is not an isolated situation, rather an all-too-common occurrence of overlooking receiving and put-away when experiencing fundamental inventory accuracy problems downstream. However, a combination of education and seeing other distribution centers operate at greater efficiency with automated processes is leading to a noteworthy change in adoption by many mid-sized organizations.



Picking proficiency



The cascading benefits of receiving, put away and replenishment truly surge at the picking stage of our river – where voice automation technology has demonstrated its ability to improve distribution center employees' accuracy and speed.

The Voxware voice-enabled technology provides the ability to choose picking mode (for example, piece, case, full pallet, split-case, layer, cluster & batch picking, etc.); pick single or multiple orders to various locations; employ multi-level dialog strategies for extreme accuracy and productivity; and optimize the workforce by distributing and prioritizing tasks.

Additional functionality specifically for e-commerce operations includes streamlining high-volume picking and speed picking using multimodality at locations containing multiple SKU's.

An example, Frontier Distributing, is a Voxware customer who was seeking to modernize their distribution center and streamline operations for shipping to their 700 pet specialty retailers. A specific need was to enhance picking accuracy and eliminate their slow, outdated paper pick-ticket process. Their challenge in doing so was that their products were so similar that employees often selected an incorrect item.

Through voice automation, the paper pick-ticket system was shifted to digital and picking accuracy rose to a near perfect 99.99% accuracy. Frontier was also able to significantly reduce the time spent training new employees. Additionally, through the use of VoxPilot – Voxware’s supply chain analytics solution – Frontier achieved more efficient, logical picking paths and sped up the productivity of its workers. Overall, Voxware has helped improve the employee experience at Frontier.

Voice automation also produces a drastic reduction in training time for new employees and seasonal hires. Through VoxTempo™, Voxware’s natural language voice recognition technology, Voxware enables new hires to complete onboarding and time to full effectiveness in minutes. Without the need to train a voice profile, workers can be on the floor working their very first day on the job.



Counting cycles down the stream

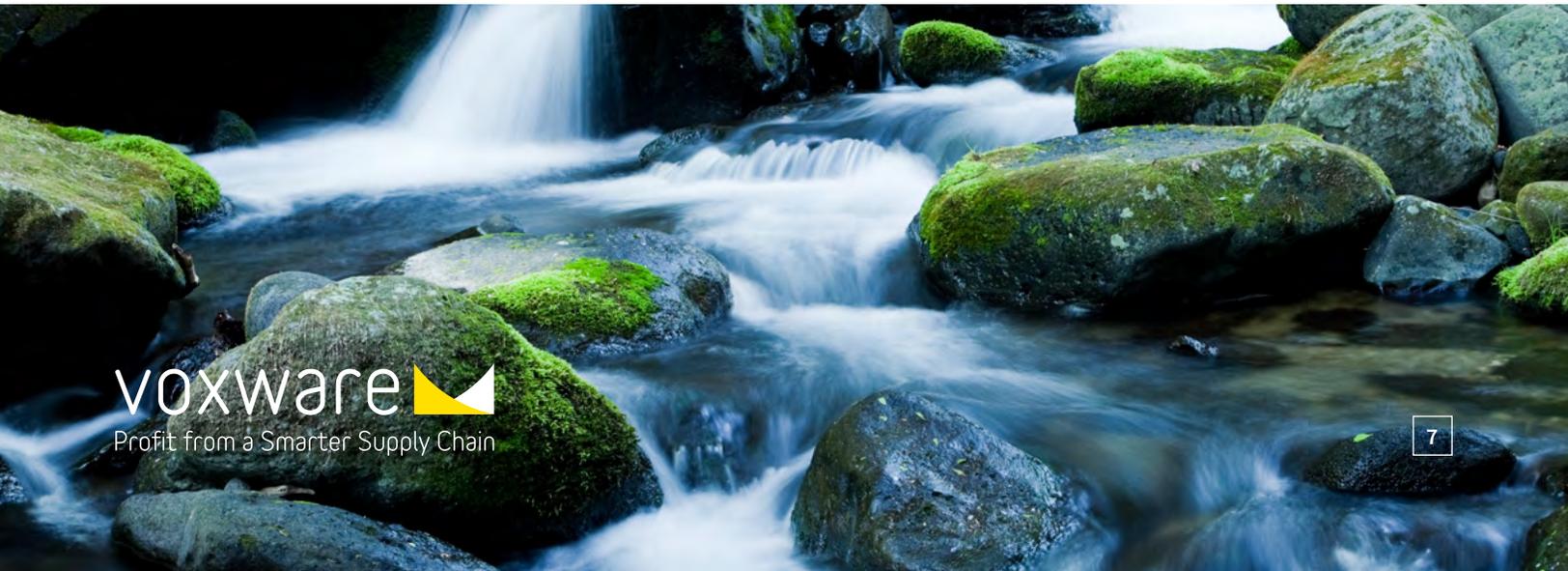


Adding multimodal technology into the cycle counting procedure allows users to optimize work, maximize accuracy via continuous inventory validation and capture relevant data, including (but not limited to) expiration dates, lot, serial numbers and quantity.

Multimodal technology can be deployed to provide system-driven assignments that dispatch employees equipped with the appropriate mobile technology to validate location and be prompted to perform a count.

To prevent shrinkage, some companies utilize a blind count scenario where there is no mention to the employee if the count matches the system inventory. The voice system gives the employee acknowledgement of their count and then prompts them to move to the next location.

In addition to the audio validations and location coordination, the employee will not need to pick up product, record counts on paper, make secondary entries or enter the results into a computer from a keyboard. Just as in the other stages of our river, multimodal technology drastically reduces opportunities for human error while speed and efficiency spikes.



Last stop: packing and loading



Our river then gets to its final destination before heading out to sea. Packing and loading is the last step as inventory moves out the door and your customer gets the right order – on time – and you earn customer loyalty and improve brand reputation.

As demonstrated, multimodal technology deployed along every stop in the distribution center can guarantee a successful and speedy movement to this stage, and it is just as vital at this final point. Objectives for packing and loading include the use of product-specific instructions, avoidance of packing errors, the option to capture high-cost items through video/images to reduce liability and a final pre-shipping QC check.

For one of its retail customers, Voxware deployed an Augmented Reality (AR) application for packing orders. With more than 200 unique packing instructions, Voxware's customer wanted to automate the process for its workers. The companies worked together to digitize all the packing instructions for each end-customer served (store fulfillment and direct-to-consumer). When the worker scans the order at the pack station, the specific packing instructions unique to that customer appear on-screen. The worker remains hands-free and confirms the actions of each step of the instructions by voice, so each order is packed to individual customer specifications.



Tech marches on

The necessity of improving the entirety of the distribution center is being bolstered through some truly exciting advancements in technology. Such stunning improvements to efficiency are hard to pass up and interest levels are rising.

Indeed, much of what was promised by AR and image-based artificial intelligence (AI) has come to fruition and is now being implemented. While an obvious initial application of this technology was in the picking process, we are seeing interest from distribution centers of all sizes in deploying these solutions into the interrelated stages of the distribution center ecosystem.

By embracing AR solutions powered by AI, human judgment (and subsequently, human error) is essentially removed. What is truly exciting, is the speed with which advancements and optimizations are becoming available. Earlier, we discussed how AR is being used to great success in packing; let's look at how that technology is being improved upon through the following two examples. The first shows a "traditional" AR solution and the second demonstrates a new AR+AI approach.

In the first example, a Voxware multimodal solution that included augmented reality was deployed for a customer. For their needs, workers wearing AR glasses look at an image displayed in their glasses and then at a product. If it is a match, they select it, put it into the cart and move to the next assignment.



In the second, we see the logical progression of this technology using AI. This system uses image recognition to remove the potential point of failure – employee error in matching the item (which can be small with limited identifying characteristics) with the sample image. Here, AI algorithms that have been trained to identify products and match them to images will be used. The employee captures an image of the item using their AR glasses and the system decides if it is truly a match. If so, the system gives the employee a voice command or a thumbs up icon visible in the glasses to confirm that the correct item is picked and can go into the tote. If not, the employee is notified with a negative indication. The worker would return the product to its proper bin and the system resends the pick for the worker to select again.

Real-time productivity metrics are visible in a user's field of vision.

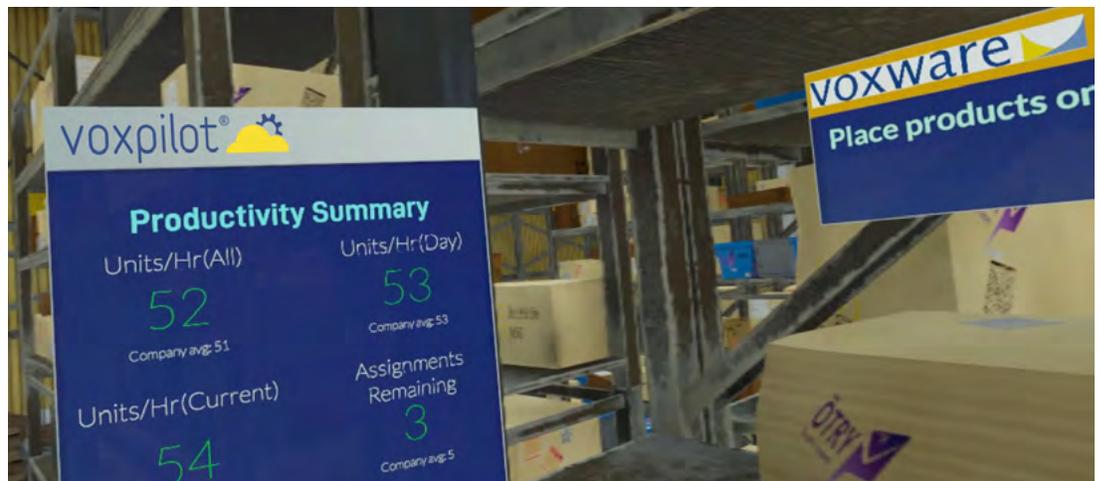


Image recognition and artificial intelligence

Voxware is currently working with a distribution center to push the potential of AR, image recognition and AI to new and exciting levels. The implications of such breakthrough technologies will mean significant improvements in picking accuracy and reduction of the workforce required to perform inventory audits.

The image comparison technology needed to enable this advancement is already being implemented in a multitude of industries. Its use in the distribution center environment is straightforward: the picker takes a photo of an item, the algorithm cross-references the photo with an image library and then accepts or rejects the selection.

One challenge to this lies in properly training the machine learning algorithm. A clean, steady sample image captured in a brightly lit room is a far cry from the reality of a busy distribution center. The picker may move their head, creating a blurry photo. Perhaps the product is dirty. The images may be captured from different angles, or the lighting could be poor.

The algorithm must be smart enough to compare a potentially deficient picture with a quality image and still generate the correct instructions. To accomplish such accuracy, the algorithm must be trained using a variety of images for each item to be validated.

Such training can be a time intensive prospect and as such may not currently be an ideal solution for distribution centers with inventory that changes often. However, as the technology progresses, it will become easier and faster to train the AI to correctly identify what it sees.

Such solutions are when, not if advancements. AI's potential for distribution center performance improvements coupled with its exponential growth means that we will see it in use with growing frequency, and Voxware is proud to be at the vanguard of its development.

Accuracy nearing perfection

For direct-to-consumer shipping, accuracy is of the utmost importance. In Voxware's most recent holiday survey, 30% of consumer respondents stated that they would avoid shopping with a retailer again if a single order was late or incorrect.

On the B2B side, performance is heavily scrutinized and perhaps the difference between the renewal of a contract or losing the business. For healthcare customers, the results could be far more devastating.

The solution, as demonstrated, is through multimodal adoption throughout the distribution center. The result is the elimination of human error, driving accuracy to nearly 100%. This is a game-changer for an industry that relies on getting it right.

As opposed to massive competitors like Amazon, many businesses simply cannot afford to support a dedicated internal team to develop proprietary technology for their distribution centers. This makes an option like Voxware, and its ability to quickly onboard new clients through a cost-effective Cloud-based subscription model, an invaluable solution. By doing so, the playing field is substantially leveled as even smaller distribution centers can implement systems to rival multi-billion-dollar operations.

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Analytics offer flood prevention

The cascading benefits of a flowing distribution operation are only realized by taking a holistic approach to optimizing the distribution center with multimodal solutions. It is imperative to shore up the riverbank at every stage to ensure the river flows in its intended path. These gains can be further amplified by layering-in an analytics solution like VoxPilot to allow for real-time management of productivity.

Designed to make sense of the information gathered from the automation technology like voice, scanning and vision, a robust analytics program checks the following boxes:

	 Descriptive Real-time DC activities	 Diagnostic The "why" behind what's going on	 Predictive What's to come	 Prescriptive What you could and should do
EXAMPLES	<ul style="list-style-type: none"> • Workforce productivity • Work in progress • Frequently picked SKUs 	<ul style="list-style-type: none"> • Individual worker productivity • Exception errors & shorts • Equipment utilization 	<ul style="list-style-type: none"> • Capacity plans based on real data • Traffic analysis & weather conditions • Labor management & volume matching 	<ul style="list-style-type: none"> • Truck loading & scheduling recommendations • Demand forecasts
BENEFITS	<ul style="list-style-type: none"> • <i>Optimize workforce</i> • <i>Active adjustments to meet all timelines</i> • <i>Optimize pick paths</i> 	<ul style="list-style-type: none"> • <i>Eliminate overtime & additional shifts</i> • <i>Improve inventory accuracy</i> • <i>Improve asset management</i> • <i>Reduce costs</i> 	<ul style="list-style-type: none"> • <i>Forecast future labor requirements</i> • <i>Improve routing & on-time deliveries</i> • <i>Optimize workforce & seasonal staffing</i> 	<ul style="list-style-type: none"> • <i>Avoid late deliveries</i> • <i>Advance planning</i> • <i>Optimize the entire supply chain</i>

Analytics allow screens in the facility to project real-time metrics to the team and Voxware's AR smartglasses feature a pane where performance analytics can be displayed, allowing users to view their personal productivity as they work.

Supervisors using VoxPilot can access worker productivity metrics through a management console and coordinate activity, assign work, receive alerts if an employee's output drops below their norm and oversee the entire workforce's efficiency in a quick, easily digestible format. VoxPilot can even provide an opportunity to respond to predictive data like future weather and traffic reports to help the distribution center manager adjust picking, packing, loading and shipping appropriately.

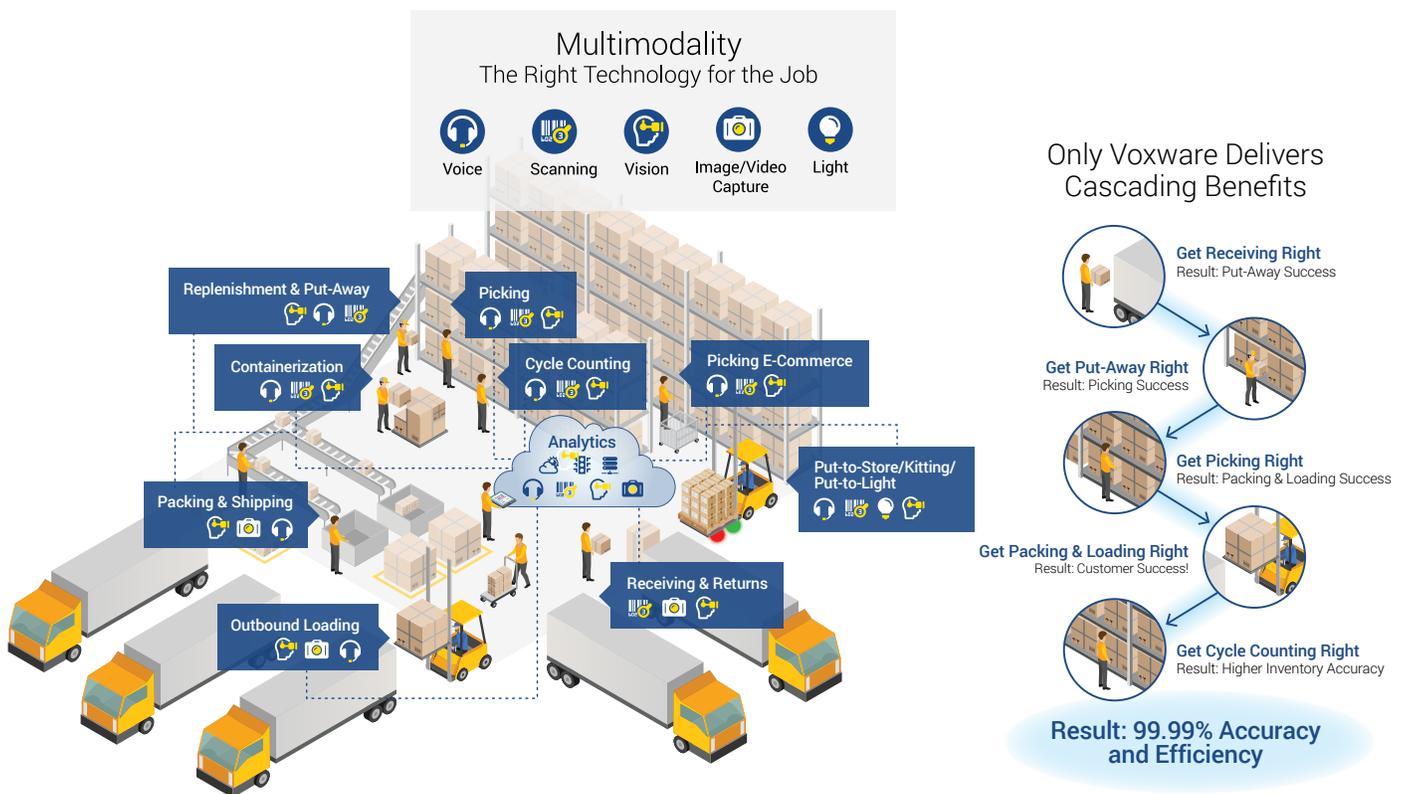
It is a system that empowers informed decisions and actionable steps based on critical data. The outcome being a cascading river with faster flow and greater control.

Finding the right fit

With the varying complexities of distribution center needs, incorporating technology like Voxware VMS is not a one-size-fits-all solution and demands a strategic eye. What works for one distribution center may not be the best option for another – success lies in matching the right technology for the right task for each function.

While voice might be appropriate for one task, scanning is preferable in the next. Certain employees may be efficient with vision while others will perform better with scanning.

Voxware performs a detailed discovery and onboarding process with every customer to ensure that distribution centers implement the most useful combination of solutions for their unique needs.



Adapting to a changing world

The e-commerce effect on distribution centers over the past 20 years has been nothing short of spectacular. This explosion in demand has fundamentally changed the way distribution centers are expected to perform.

According to ACI Worldwide, there has been an unprecedented surge in online shopping due to the COVID-19 pandemic, with online transaction volumes in most retail sectors seeing a 74% increase in March, 2020, compared to the same period last year. Similarly, UPS reported a sharp escalation in average daily shipping during Q2, 2020, with a 65% increase in deliveries to homes.

Perhaps one of the biggest takeaways from COVID-19 is that there is much room for growth in the e-commerce area. Consumers who were previously reserved or abstained totally from buying online have been indoctrinated. A recent Forrester poll demonstrated that 21% of survey respondents said that the first time they purchased groceries online was after the pandemic started.

When demand for products shipped to the door increased, so did the strain on distribution center operations and supply chains. As consumers further develop a taste for all categories of online shopping and shipping, we forecast a perpetuation of these trends.

PayPal Chief Executive Dan Schulman stated in July 2020: “The world has moved to a digital-first economy and I don’t think there is any going back,” and that the COVID-19 pandemic has created a “tipping point” for online shopping which drove an acceleration in e-commerce penetration in months that would have otherwise taken three to five years to realize.

E-commerce will, therefore, continue to test distribution centers, forcing the industry to evolve and accommodate dynamic demand.

Conclusion

The key to thriving in these conditions lies in the application of technology like Voxware VMS. The dramatic results from distribution centers where it is currently being utilized is a testament to that potential.

If the concept of creating cascading benefits in the interconnected distribution center resonates with you, contact Voxware today to learn more about how to automate your operation through a multimodal approach.