



## Optimizing Your Warehouse with Voice

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**A Vocollect White Paper**

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## Executive Overview

Businesses today face many challenges and nowhere is it more prevalent than the supply chain, particularly in the distribution center (DC), where supply meets demand. Management is expected to contain or reduce costs while supporting higher volumes of goods and improving customer service levels. To meet these expectations, new technologies are often evaluated for their ability to add efficiency and to provide a competitive advantage in the marketplace.

While many organizations use a combination of technologies, industry leaders have determined that using a single technology, voice, can provide significant synergies across multiple workflows.

This white paper explores how voice technology addresses key business challenges, compares it with other available technologies, and, finally, provides an overview of the benefits a voice-enabled warehouse/DC can provide.

## Key Business Challenges in the DC

### Business Growth

In a survey commissioned by Vocollect over 200 logistics executives with distribution management responsibilities responded that “Supporting Business Growth” was one of the top reasons that prompted them to investigate new technology-based solutions. Organizations today are looking to process higher volumes or a larger number of unique products with the same resources. A major concern for growing businesses is to avoid operational bottlenecks and depleted stock locations while reducing labor costs (particularly overtime). The goal of technology is to synchronize the flow of products and maximize efficiency throughout the DC.

### Improving Customer Service

Order accuracy is critical and is often a core performance metric in supporting customer service level agreements. For example, a DC with an order accuracy level of 99.0% that ships 10 million orders per year will produce 100,000 errors per year. Assuming the cost per error is \$10 to \$20, the bottom line impact of a 1% error rate will equate to \$1 to \$2M. Furthermore, this large number of errors will generate customer complaints, refund requests, redundant shipping charges, and ultimately will inhibit profitable growth.

As errors can be introduced at multiple points in the DC, reducing error rates typically requires process changes across multiple workflows.

## Reducing Operational Costs

World-class businesses are finding ways to reduce operational costs as they support top-line growth and improve customer service by redesigning processes and deploying cost effective technology. In many DCs, the most labor-intensive tasks have already been addressed with process change and technology - so how do managers find new sources of operational cost reduction without sacrificing customer service levels?

## Finding the Right Solution to Address Key Business Challenges

The leading technologies used in the DC today include voice, RF bar code scanning and pick-to-light. Each technology has inherent benefits that vary based on the unique aspects of the deployment environment and use case. Additionally, each technology provides a significant improvement over paper.

	Paper	Voice	RF Scanning	Pick-to-Light
<b>Accuracy</b>	97% - 99%	99.8% - 99.98%	99.3% - 99.5%	99.5% - 99.7%
<b>Pick Rates (cases)</b>	to 220 lines/day	to 300 lines/hour	to 200 lines/hour	to 350 lines/hour
<b>Training Time</b>	2-5 days	1-2 days	2-4 days	1-2 days
<b>Deployment Agility</b>	Flexible	Flexible	Flexible	Not Flexible
<b>Applicable Uses:</b>				
• Picking	Yes	Yes	Yes	Yes
• Replenishment	Yes	Yes	Yes	No
• Receiving	Yes	Yes	Yes	No
• Inventory Count	Yes	Yes	Yes	No
• Mixed Tasks	Yes	Yes	Yes	No
<b>Maintenance</b>	High	Low	Low	Very High
<b>Ergonomics</b>	Hands/Eyes Required	Hands/Eyes Free	Hands/Eyes Required	Hands/Eyes Required

Figure 1. Comparison of leading warehouse technologies. Estimates are based on reported savings. Source: Vocollect.

As the chart above shows, voice stands out by providing a flexible solution with high accuracy and reasonable implementation costs. While RF scanning is less expensive, it is also less efficient. Pick-to-light can prove effective in select picking locations, providing the products and locations do not change. Because voice can be deployed throughout the warehouse, organizations can obtain synergistic benefits of reduced training, integration, and maintenance only achieved by using a single technology.

Other benefits of using voice-directed work in the DC include:

- Hands and eyes are free. In picking, workers do not have to continuously set down a scanner or paper and can easily pick up multiple units at a time. For fork-based operations it means a much safer and more efficient environment - operators no longer need to look at screens for directions, eliminating accident causing distractions.
- Significant savings can be created by changing processes, resulting in savings from picking multiple orders simultaneously, interleaving workflows such as cycle counting with picking and/or put-away, or reverse picking to reduce travel time.
- Training time is significantly reduced with voice. Because the worker is told what to do step-by-step, the average worker can be trained and completing tasks at a high level in one to two hours.
- Workers are directed and paced, to keep them moving and reduce extraneous time loss.
- Individual workers can be monitored for performance. It is ideal when engineered standards are deployed.

## Addressing Key Business Challenges with Voice-Enabled Workflows

### Definition and Benefits

The most natural interface for most workers is one that allows hands and eyes to be free to perform the tasks to which the worker is assigned. A voice-enabled DC is one that delivers the benefits of 'Hands-Free, Eyes-Free®' work in most, if not all workflows and is an integral driver for re-engineering processes and systems. DCs that realize the greatest benefits generally are those that have a high velocity of transactions with a high degree of variability. Some DCs may also see significant gains from voice-centric DC design when workflows have relatively low overlap; that is, receiving, put-away, picking, replenishment and loading are performed at different times throughout the day.

The DC realizes the largest gains when voice is central to the initial design and a driver for process re-engineering. DC processes can be synchronized with one another to reduce bottlenecks. For example, two workflows that use the same type of vehicle (e.g. put-away and replenishment) may be interleaved to make optimal use of the capital equipment and increase the productivity of the drivers. Training is reduced and workers can more readily be moved between assignments as needed, since there is only one system to be learned.

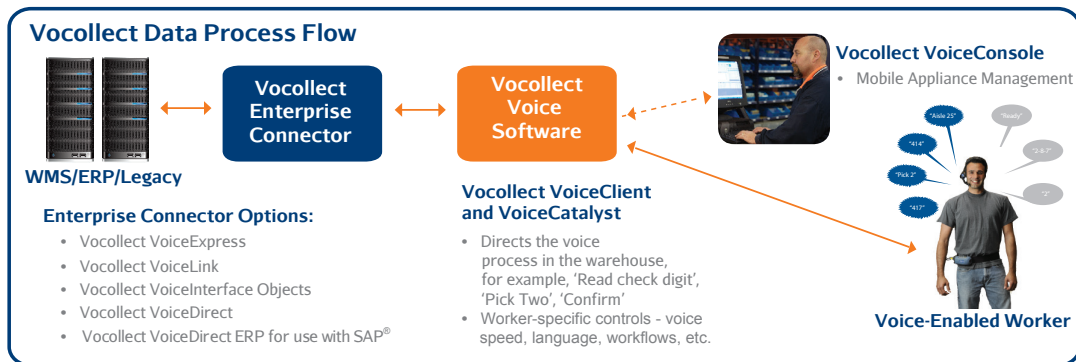
In a voice-enabled DC, processes are standardized and the human-computer interface is optimized. In particular, highly directed workflows require a high degree of input and output between the worker and the computer. In these workflows, the computer is issuing a constant stream of directions, and the worker acknowledges receipt and completion. Using voice in these applications delivers dramatic gains in speed and convenience when compared to the use of screens, keypads and handheld scanning devices.

### A Brief Overview of a Voice-Enabled Workflow

A voice-enabled workflow is one where the DC worker is directed by hearing locations, quantities, and other information from the warehouse management system (WMS) and confirming actions with voice commands. Information from the WMS is transformed to speech, guiding the worker through each line of an order, providing item location and quantity required. The worker verbally confirms the location via a number, or check digit, located where the product is stored, and then confirms the quantity picked. The voice system and worker continue through the order list until the order is complete. Verbal confirmation of actions taken, while not taking one's eyes off of the activity performed, increases accuracy. Using one's hands exclusively to pick items (versus manipulating a handheld device) makes a worker significantly more productive. In the end, voice-directed work is the most productive and accurate method of work for people who operate in high velocity DCs.

### Implementing Voice

A voice-enabled workflow solution is composed of many elements - most importantly, process expertise. Process expertise is important because implementing voice in a DC with poor processes will not generate the desired productivity and accuracy improvements. Voice-specific process expertise - combined with industry-specific expertise - is needed to ensure the maximum benefits from a voice deployment.



## WMS Interface

A voice-enabled workflow solution starts by interfacing to the WMS. The voice system, which includes both the software that defines a voice-enabled workflow and the hardware, or voice appliance, used by workers to interact with the WMS, must link with the WMS in order to receive work instructions, provide acknowledgements of tasks completed, and update inventory levels. To minimize costly customization, the system should allow for multiple interface options, as WMS providers vary in their approach. With some WMSs, the WMS provider will implement a direct interface that integrates the new voice process logic directly into the WMS and enables a real-time interface between the voice system and the WMS. With others, a middleware application can provide the ability to communicate to and from the WMS without making WMS code changes.

## Voice Applications

A voice application is created for each workflow and specifies precisely the interaction between the WMS and the worker. Typically a separate voice application is developed for each workflow in the DC (e.g., picking, put-away, replenishment). If workflows are interleaved, a voice application will be developed for the combined workflow. These applications are developed using vendor-supplied tools and, once complete, are loaded onto the voice appliance. The system must allow voice-enabled workflows to be developed quickly to adapt to any changes in DC operations.

## Voice Appliance and Headset

For workers, the essential components of the voice solution include a purpose-built voice appliance, an industrial headset and the associated voice software. This combination converts directions from the WMS (e.g. which items to pick) into speech which the user receives through the headset. It also recognizes the user's speech and captures this input into the system. The voice appliance may be worn on a user's belt (battery-powered) or may be mounted on a vehicle (vehicle-powered). The appliance runs firmware which processes the voice applications, communicates with remote systems, converts text instructions to speech, and recognizes the user's speech.

## Management of the Voice System

To better manage voice appliances, a "dashboard" monitoring and management system is deployed within the DC. Such a management system enables device management, downloading of new voice applications to the appliances, viewing of performance statistics, tracking of device locations, battery performance monitoring, and other functions.

Integrated voice-directed systems are optimized to provide the ideal solution, enabling organizations to achieve key business objectives with the lowest overall total cost of ownership. In addition, the ergonomics of a purpose-built integrated solution improve worker satisfaction - reducing absenteeism, turnover and costly errors.

### **Integrated Voice Solutions: Purpose-Built for the Distribution Center**

The DC environment demands an 'end to end' solution designed specifically for the challenging DC environment. While various suppliers may offer components of the solution, when a solution is assembled using multiple suppliers, the customer or value-added reseller takes on the onus of creating an inter-operable solution.

By deploying an integrated, end to end solution such as Vocollect Voice®, the organization will realize greater return since it has been tuned and optimized for their environment. A true end-to-end solution starts with the headset - with a microphone that is designed to "hear" the user's voice and filter out ambient noises. The microphone must be able to withstand the rigors of the work environment, including extreme temperatures and/or condensation that is present in many facilities. To ensure worker safety, a purpose-built headset cable and connector are designed to safely disengage (without damage) from the voice appliance if the cable is "snagged". Alternative solutions require expensive adapter cables and typically provide non-rugged connections that are often sources of speech recognition errors, impacting speed. Wireless options that have been tuned for high quality transmission of voice (in order for speech recognition to operate properly) are also available for applications which require cable-free use.

A voice appliance like the Vocollect Talkman®, which is a purpose-built mobile computer for DC applications, is able to withstand extreme temperatures and handle the drops and bumps that accompany DC work. These appliances are ergonomically designed, with minimal need for keypad usage. Purpose-built appliances also eliminate the need for an integrated display which is often a source of error, inefficiency, and breakdowns. The battery in these appliances typically accommodates a full shift, plus overtime (8 to 12 hours). It also accommodates a wide variety of languages, dialects and accents (including its OS, memory, audio circuitry, and speech recognition software).

Vehicle-based workers can also benefit from voice-directed work using the same voice appliance in a vehicle mount configuration.



In addition to the voice appliance, some applications may be optimized by using additional technologies that complement voice. For example, in receiving, an adjunct screen can be useful for applications requiring an operator to browse through large amounts of information which would be less efficient if delivered using voice. Also, long pallet identification numbers must be recorded, or where one is inducting totes, a barcode scanner may be used in conjunction with the voice-based system.

While it is possible to deploy a system that is a combination of individual disparate components, this approach often results in sub-optimized processes, higher maintenance costs, and difficulty in diagnosing root causes of system problems. Thus, an end-to-end solution design must include all of the necessary components outlined above to reduce ongoing costs and problems.

## Conclusion

A voice-enabled DC provides a strategic platform which enables companies to grow while controlling operating costs and improving customer service levels. Voice-directed workflows enable hands-free, eyes-free work and provide the most natural and effective method for workers to complete their jobs. Voice-enabled DCs that implement an end-to-end solution realize the highest gains with the lowest overall cost of ownership due to process improvements and synergies gained from training and equipment use that can only be obtained by using the same technology across workflows.

# Improved Accuracy. Increased Productivity. Real Business Results.

Vocollect by Honeywell is the leading provider of innovative voice-enabled workflow and data collection solutions that help companies with mobile workers run a better business. Together with a global team of over 2,000 Vocollect Certified Professionals, Vocollect enables companies to save more than \$20 billion annually by further optimizing operations, improving business decision capabilities, and delivering the industry's premier worker experience to nearly one million mobile workers who process more than \$5 billion of products every day in challenging industrial environments. Vocollect integrates with all major WMS and ERP systems and supports the industry's leading handheld computing devices. Contact Vocollect today to learn how we can help you transform your operational and workforce performance.

## Vocollect by Honeywell Headquarters

703 Rodi Road  
Pittsburgh, PA 15235  
United States

+1.412.829.8145  
[info@vocollect.com](mailto:info@vocollect.com)

## Vocollect EMEA

Gemini House  
Mercury Park  
Wycombe Lane, Wooburn Green  
Buckinghamshire, HP10 0HH  
United Kingdom

+44 (0) 1628 55 2900  
[voc\\_emea@vocollect.com](mailto:voc_emea@vocollect.com)

## Vocollect Asia-Pacific

Unit 3, 29/F, Sino Plaza  
255-257 Gloucester Road  
Causeway Bay  
Hong Kong

Hong Kong: +852 3915 7000  
China: +86 10 5957 4817  
Australia: +61 409 527 201  
[apac@vocollect.com](mailto:apac@vocollect.com)

## Vocollect Latin America

North: +52 55 5241 4800 ext 4915  
South: +1.412.349.2477  
[latin\\_america@vocollect.com](mailto:latin_america@vocollect.com)

## Vocollect Japan

Shiba 2-Chome Bldg 8F  
2-2-15 Shiba, Minato-ku  
Tokyo 105-0014 Japan

Japan: +81 (0) 3 3769 5601  
[japan@vocollect.com](mailto:japan@vocollect.com)

## Vocollect Singapore

151 Lorong Chuan  
#05-02A/03 New Tech Park, Lobby C  
Singapore 556741

Singapore: +65 6305 2369  
India: +91 124480 6738  
[singapore@vocollect.com](mailto:singapore@vocollect.com)

[www.vocollectvoice.com](http://www.vocollectvoice.com)

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