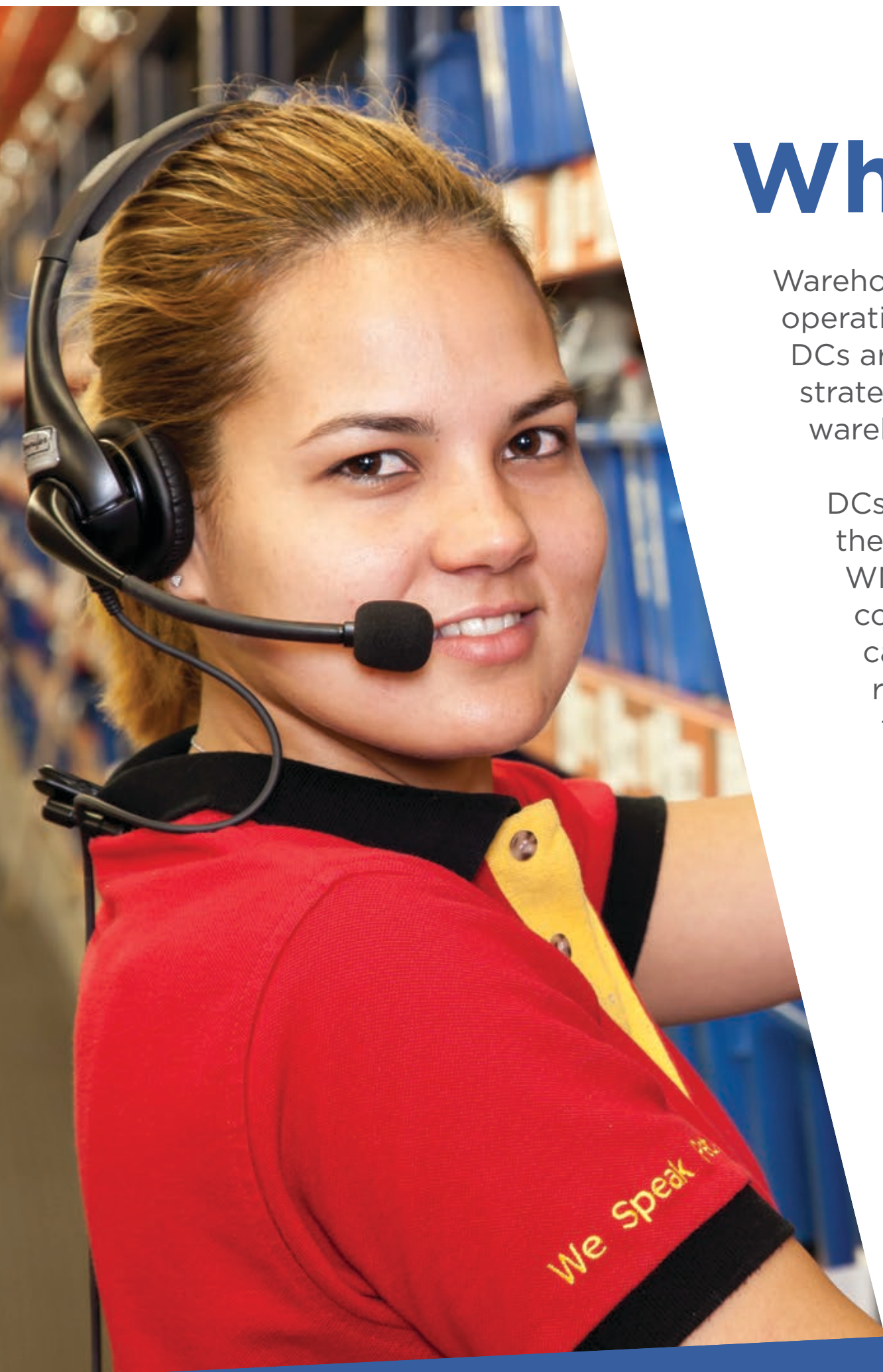




WMS Upgrade Guide

Three Ways To Improve
Warehouse Management With
Or Without A New
Warehouse Management
System



Why Read The Guide?

Warehouses and distribution centers face tremendous pressure to adapt their operations to meet changing customer and market demands. To meet the demands, DCs are investing in new technologies and simultaneously developing renewal strategies for their current technology systems and infrastructure, especially their warehouse management systems (WMS).

DCs using legacy WMS systems have more options than ever when thinking about their future needs. In addition to scores of capable on-premises and cloud-based WMS packages, DCs can turn to best-of-breed work execution solutions that complement the core capabilities provided in existing WMS packages. In many cases warehouses can avoid the time, risk and expense of a WMS upgrade or replacement by supplementing their current systems, regardless of how old those systems are.

This guide provides an overview of three strategies for improving warehouse management and provides examples of companies that have used work execution software to extend and expand new or old host, ERP and warehouse management systems. The three strategies and examples are:

- 1) Legacy Renewal Strategy** - Add new work execution software to an existing ERP or WMS.
- 2) Bridge-to-New Strategy** - Install work execution alongside a legacy system prior to a WMS upgrade.
- 3) Upgrade Gap Strategy** - Implement work execution software to fill gaps in a new WMS.



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The Legacy WMS Challenge

Virtually every company operating a DC today is challenged to fill orders more quickly, accurately, and efficiently while dealing with more varied – and changeable – customer requirements. In response, warehouses and distribution centers are investing in a range of technology solutions, from proven tools like voice and AS/RS systems to newer technologies including autonomous mobile robots (AMRs) and artificial intelligence. As companies develop their roadmaps for new DC technology, they are also evaluating their existing warehouse systems. This is especially critical for the majority of DCs operating older warehouse and inventory management systems.

WMS software packages were first introduced in the 1990s, so it's no surprise that 59% of warehouses and distribution centers are using WMS systems that are more than five years old¹. In addition, many DCs rely on custom-built inventory systems or the limited warehouse management functionality of their ERP systems. Given the prevalence of legacy systems, 41% of warehouse and distribution center executives say they plan to evaluate, purchase or upgrade warehouse management systems in the next two years².

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¹ McCrea, Bridget. "Software Survey: Readers Embrace Software's Leading Role in Warehousing and Distribution." Recently Filed RSS, 16 July 2019, www.mmh.com/article/warehouse_survey_readers_embrace_software_s_leading_role_in_warehousing_and/software.

² McCrea, Bridget. "2018 Software User Survey: We Need More Technology, Please." Recently Filed RSS, 11 July 2018, www.mmh.com/article/2018_software_user_survey_we_need_more_technology_please.



Evaluating Your WMS: Identify The Gaps

The first step in developing a WMS renewal strategy is to identify the gaps in your current system. This step can help determine whether you truly need a new warehouse management system, or if you can supplement your current system with other software that fills the specific functional voids you have identified.

In terms of core warehouse management functionality, many DCs and warehouses find that their current system provides more than adequate support for their inventory management needs for the foreseeable future. On the flip side, host, legacy WMS, and ERP systems tend to have the largest gaps in the areas of advanced warehouse execution, process optimization, and management visibility and analytics.

In particular, legacy warehouse systems tend to have limited capabilities for:

- Dynamic work planning and continuous order release for multi-channel fulfillment.
- Intelligent task optimization and system-directed work execution.
- Slotting and inventory optimization.
- Real-time management reporting.
- Advanced analytics, including multi-site visibility and predictive planning.
- Labor management, including workforce planning and performance management (LMS).
- Transportation management, including load planning and multi-carrier parcel management (TMS).

Sidebar: What Are The Main Functions Of A Warehouse Management System?

Warehouse management functionality can be divided into three general categories: Inventory Management, Work Execution, and Reporting. While most warehouses and DCs today use a dedicated WMS, many rely on the warehouse management and inventory capabilities of other enterprise systems, including ERP, order management systems, or route accounting software (RAS).

As might be expected, different systems offer different levels of capability. For example, many ERP and RAS systems provide basic inventory tracking capabilities (how much inventory of a given product is in the warehouse), but they may not have detailed tracking to the bin level (what quantity of product is in each location – forward pick location versus overstock, etc.). Bin level tracking is common in most standalone WMS packages.

In addition, it is common for DCs to purchase add-on modules to supplement the basic warehouse and inventory capabilities of their WMS or ERP systems. For example, many warehouses buy standalone labor management systems to provide richer productivity tracking, workforce planning and labor standards tools. Likewise, it is increasingly common for DCs to supplement their WMS with external work execution systems. Many DCs use warehouse control systems (WCS) to manage the execution of automated material handling processes. And more and more are adding work execution or warehouse execution systems to optimize the physical movement of products by people and/or machines, including autonomous mobile robots (AMRs).

See Chart On Next Page

Core WMS Functions

WMS

Inventory Management



- 1) Track and allocate inventory within the warehouse or DC.
- 2) Manage locations and plan storage.
- 3) Manage inbound receipts and putaway.
- 4) Plan and schedule product moves.
- 5) Manage outbound order release and load/route planning.
- 6) Plan and manage inventory counts.

Work Creation & Execution



- 1) Plan detailed work activities by task and area.
- 2) Manage and allocate labor by activity and area.
- 3) Create, release and manage work assignments.
- 4) Direct inbound & outbound tasks:
 - Receiving, putaway, replenishment, picking, packing, loading and returns.

Reporting & Analytics



- 1) Inventory and storage
- 2) Work, task and assignment execution
- 3) Labor productivity and performance
- 4) Order status
- 5) Equipment

Why Consider WMS Alternatives?

For warehouses that are happy with the inventory management capabilities of their system, there are a number of ways to add new functionality without replacing current systems. Three common solutions for supplementing core WMS functionality are labor management, transportation management and slotting software. While some WMS vendors offer LMS, TMS and slotting as add-on modules to their WMS product, there are also a number of specialist software providers that offer best-of-breed systems.

Work execution (or warehouse execution) software is a newer class of add-on solution that provides optimization and advanced work execution capabilities beyond the traditional inbound and outbound functions of a warehouse management system. Work execution solutions also add advanced reporting and analytics.

Adding best-of-breed solutions (whether work execution, slotting, LMS or TMS) outside of an existing WMS offers a number of benefits. First and foremost, best-of-breed solutions typically provide richer, more configurable capabilities than comparable modules of an all-in-one WMS.

Other advantages of installing best-of-breed solutions rather than replacing your entire WMS include:

- Shorter implementation time
- Lower cost
- Less risk
- Faster time to value
- Larger return-on-investment
- Richer capabilities

Five Areas Where Work Execution Systems Improve Warehouse Management and Operations

As a newer product category, it's worth explaining the core capabilities of work execution software. First, a work execution system can rely on the inventory and order management capabilities of a WMS, host or ERP without change.

Using order and inventory information from other systems, work execution software improves warehouse and DC operations in five areas:

- **Flexible work creation and execution in outbound processes:**
 - Break free from strict wave-based picking
 - Create variable pick processes for different order types and/or profiles
 - Dynamically prioritize and optimize work assignments (batches, for example)
- **Process optimization and reengineering of inbound and outbound processes, including:**
 - Zone picking
 - Batch picking
 - Two-stage picking
 - Real-time replenishment and short filling
 - Task interleaving
 - Travel/pick path optimization

- **Workflow improvement for hands-on tasks:**

- Efficient, consistent system-directed processes (replace paper)
- Seamless use of multiple modes of user interaction (i.e., multimodal mobile applications), including:
 - o Voice direction and speech recognition for hands free picking
 - o Opportunistic barcode scanning where needed (including product tracking to meet regulatory requirements such as U.S. DSCSA, FSMA, etc.)
 - o Delivery of display information in wearable technology (smartwatches, smart glasses, etc.)

- **Real-time orchestration of manual work with automation systems, including autonomous mobile robots (AMRs):**

- Coordination of human work activities with automation systems and robots
- Scheduling and travel optimization for AMRs

- **Enhanced management visibility and control:**

- View and manage work in process
- Give managers and associates immediate productivity and performance metrics
- Enable real-time exception alerts
- Rich data capture for AI-based predictive analytics

While the full feature set of a work execution solution may overlap with some WMS capabilities, the modular nature of work execution systems allows DCs to install only the specific functionality they need. For example, one DC can use its WMS to create and release waves of orders for picking unchanged, and use work execution software to create optimal picking assignments and direct the detailed picking process. Another DC can use the flexible work creation and release capabilities of a work execution system to replace wave-based order processing with a continuous order release process.

The final section of this paper uses three real-world examples to illustrate how work execution software can be used to support three very different WMS transition strategies.

WMS Transition Strategies Using Work Execution

Legacy Renewal

The following example illustrates how DCs can add new work execution capabilities to an existing ERP or WMS, what we refer to here as a Legacy Renewal Strategy.

Rotary Corp., based in Glennville, GA is the world's largest supplier of outdoor power equipment parts, tools and accessories, serving mass merchants, OEMs, repair shops and domestic and international distributors. Several years ago the company sought to revamp its 250,000 square foot central DC to support continuing growth and ongoing pressure to meet next-day delivery promises.

DC operators were generally happy with their LogPro WMS from Manhattan Associates, but they recognized that their fulfillment systems and processes could not keep pace with rising volumes. They embarked on an 18-month DC retrofit, which included the design and installation of a new two-level split case picking module, reconfigured full and split case picking areas, automated conveyors and an outbound sortation system.

Rather than replacing the WMS, Rotary added Lucas Work Execution software to direct and optimize processes within the reconfigured DC. In the new

configuration, the Lucas software creates units of work to optimize pick density and throughput across all order types (small parcel, LTL, etc.). It then orchestrates the picking and replenishment process in the reconfigured warehouse areas, using voice-directed mobile applications to replace WMS-directed RF processes. The Lucas Work Execution System includes efficient new workflows like bucket brigade and pick-to-tote styles for fast moving piece pick items. Finally, the Lucas system provides dashboards that give managers and supervisors real-time visibility into work in process, associate productivity, and exceptions, helping them to efficiently allocate staff and manage work.

The reconfigured DC has set new daily and monthly shipping records while improving order accuracy and achieving 99.9% same-day shipping rates on all orders received by 4 pm. Today, the same staff is able to pick a higher number of orders in nine hours or less, a reduction of about 25% in picking hours. Replenishment productivity has increased at least 10%, and the Lucas solution has significantly reduced stock outs in forward pick locations.

Work Execution As A Bridge To New WMS

Our next example features a company that had a longer-term plan to move to a new WMS and installed work execution software to achieve operational improvements as a bridge to the new system.

The Container Store is the leading U. S. retailer of home storage and organization products, with a nationwide retail network and a growing ecommerce business. They are perennial winners of Forbes' Best Places to Work award, which is highly relevant to how they purchase technology.

With steady store expansion and ecommerce growth, the company was anticipating long-term changes to their DC systems and infrastructure. Their 5-year technology plan included replacing a customized legacy WMS package (Catalyst). In the shorter term, however, they needed to optimize hands-on work processes to improve efficiency, accuracy, safety and ease of use for workers. A key requirement was that a new execution system would need to grow and evolve with the rest of their DC infrastructure.

The Container Store initially implemented the Lucas Work Execution solution for order picking and saw double-digit productivity gains, helping to fill growing order volumes without creating undue burdens for employees, making the workplace safer, and improving accuracy and customer service.

Later, when The Container Store implemented a new WMS from Manhattan Associates, there was minimal change for workers on the warehouse floor who continued using the Lucas Work Execution system and voice-directed mobile applications. Subsequent to the WMS roll out, The Container Store added new automation systems and made other changes to the DC configuration. The work execution software adapted, with integration to the new WMS, LMS and a WCS that was implemented along with the automation systems.

This is a good example of how a mobile work execution system can evolve with operations, even as changes are made to other technology and systems behind the scenes.

Filling Gaps In A New WMS

Our final example looks at a company that was committed to upgrading their WMS and added work execution software simultaneous to installing the new WMS. This case illustrates that even a brand new, best-in-breed WMS may have gaps and voids that can be filled by work execution software.

Like other multi-channel retailers, this company needed to revamp their ecommerce fulfillment center to support continued growth and address the throughput and labor challenges during their peak season. During peak seasons, the company's order volumes increase ten-fold and their workforce increases by 200%. A significant element of their seasonal challenge is to quickly onboard workers and ensure new pickers can work efficiently and accurately from day one.

In addition to upgrading to the latest version of Manhattan WMS (including LMS), the company also upgraded their automation systems, including a new multi-shuttle system and sortation and packing systems. With all the changes, the WMS batching and work planning rules would result in sub-optimal fill rates in totes, which would then create bottlenecks in

downstream automation systems, impacting throughput. Therefore, they needed a work execution system that could optimize picking throughput in coordination with the automation.

The Lucas Work Execution System provided dynamic work creation and execution that allowed pickers to maximize fill rates per tote, while simultaneously optimizing pick density. From a picking perspective, the Lucas solution increased product flow across the picking areas.

The Lucas voice-directed picking application was likewise optimized to provide ease of use for accelerated onboarding, while also maximizing productivity and accuracy. In addition to running on familiar Android mobile devices, the system incorporates barcode scanning for tote induction. Finally, supervisors in the various picking zones can monitor and manage picking workflows using the Lucas Work Execution System, and productivity data is integrated in real time with the new LMS. The Lucas system also works in close coordination with the automation systems.



Conclusion

Distribution centers and warehouses around the world are racing to transform their infrastructure and operations to meet new competitive pressures and customer demands for faster, error free delivery. In addition to investing in robotics and other automation technologies, many facilities are rushing to install new warehouse management systems, without considering alternatives.

Many existing DCs and warehouses would be better served by adopting a WMS transition strategy using best-in-breed work execution solutions to fill gaps in their current host, ERP or legacy WMS packages. Similar to LMS, TMS, and slotting software, work execution software supplements the core inventory management capabilities of a WMS or ERP with more flexible, adaptable workflows, and richer reporting and analytics. In addition, work execution software offers a lower initial cost and faster implementation time than installing a new WMS, as well as a larger return on investment.

About Lucas Systems

Since 1998, Lucas Systems has pioneered warehouse productivity solutions for mobile workers and distribution center managers. Tens of thousands of associates at companies like C&S Wholesale Grocers, The Container Store, HD Supply, Johnson & Johnson, Kennametal, Rust-Oleum, and True Value trust Lucas to deliver solutions that greatly improve worker productivity and accuracy because Lucas truly understands warehouse operations.

Lucas Mobile Work Execution solutions optimize hands-on work and streamline manual processes with voice-directed mobile applications that are designed to make work easier, faster, and more accurate for workers. Lucas Mobile Work Execution solutions include Lucas Engage work execution software and management dashboards, and Lucas Move voice-directed applications featuring Jennifer Voice. The solutions also include Lucas Enterprise Integration interfaces providing standard integration to warehouse planning and automation systems, including homegrown systems and leading WMS packages.



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