



THE EVOLUTION OF

# WAREHOUSE EXECUTION

# INTEGRATING VARIOUS DC AUTOMATION SYSTEMS UNDER ONE UMBRELLA

Warehouse execution systems (WES) have advanced significantly in recent years, securing an essential place among other types of distribution software as a key enabler of productivity required to succeed in today's competitive retail climate. Behind this evolution is the proliferation of innovative automation solutions and technologies in the distribution center (DC) — and the emerging need to unify and orchestrate these systems, workers and business processes.

As the availability of qualified workers continues to decline and labor costs increase, DC operators are accelerating their transition to automation through new systems, equipment and processes. But they're also encountering integration complexities, especially when these systems are sourced from different technology providers, each with unique control systems. The result is a network of disconnected "islands of automation" and pre-existing equipment that often don't communicate with each other to enable a cohesive fulfillment system.

## WHERE TRADITIONAL WAREHOUSE DISTRIBUTION SOFTWARE FALLS SHORT

The other problem DC operators soon discover is that their legacy warehouse distribution center software is simply not equipped to manage these complexities. Warehouse management systems (WMS) serve as the primary connection to Enterprise Resource Planning (ERP) systems, and provide core order fulfillment functions, including: inbound and outbound product flow; inventory tracking and management; order management; and waving.

But a WMS has very limited decision-making capabilities, particularly when it comes to the dynamic prioritization of orders and tasks once they are released to the warehouse floor.

Many DCs may also utilize warehouse control systems (WCS) to provide the machine-level integration of material handling equipment (MHE). This enables MHE to receive instructions (data inputs) from other systems — typically a WMS — and perform specific, pre-defined functions (outputs). But with its relatively limited scope, a WCS lacks visibility to inventory, orders and the people necessary to provide on-demand, decision-making capabilities.

Fortunately for DC operators, WES has quickly evolved to fill the gaps left by the WMS and WCS — namely, their inability to provide much-needed automation orchestration and seamless MHE integration.

## PURPOSE-BUILT FOR E-COMMERCE FULFILLMENT

Today's WES, such as Momentum™ WES from Honeywell Intelligrated, were designed specifically to address the escalating challenges of e-commerce order fulfillment. As the most recent distribution software to emerge, only the WES is purpose-built to enable greater degrees of automation, deliver higher throughput rates, and provide the flexibility to deal with dynamic fulfillment challenges. Fulfillment priorities change quickly in a DC, and operators need new tools to flex with them.

The WES connects disparate software, MHE and automation systems throughout a facility to better coordinate the execution of sophisticated workflows. Recent advancements have further empowered WES to provide integrated, machine-level control in cutting-edge warehouse automation, such as automated storage and retrieval system (AS/RS) shuttles and cranes, robotic picking, automatic palletizing and depalletizing technology.

But what really differentiates the WES from its predecessors is its capability to apply intelligence to business processes and workflows. For example, by enabling dynamic, real-time decision making for order prioritization and release execution, the WES provides smarter workflows and resource allocation based on available capacity in downstream areas such as picking zones or order consolidation processes like put walls or unit sortation.

Simply put, WES integrates key automation systems within the four walls of the DC to provide unprecedented throughput and productivity gains.

### **MOMENTUM WES IN YOUR WAREHOUSE**

Even though the next generation of WES software is a relatively new offering, it's already delivering demonstrable improvements in e-commerce distribution and fulfillment centers. This is especially apparent in DCs where the dynamic prioritization of orders is a daily requirement. There, Momentum has not only assumed the critical roles of order release and execution functions; it's also providing the flexibility and visibility into real-time product flows and order fulfillment lifecycles.

The following scenarios are actual real-world examples of how Momentum is delivering dynamic prioritization in e-commerce DCs:

#### **INTELLIGENT ORDER MANAGEMENT AND RELEASE**

Instead of pushing out orders in large batches and hoping they get shipped at the correct times, Momentum utilizes a pull model for order release. This process starts with checking the downstream capacity across various work areas of the DC to ensure that none are starved or overloaded. Then, the software determines which orders are the highest priority, and instructs operators to perform the next best tasks needed to complete them as capacity becomes available.

For example, consolidating and shipping orders comprised of products from varying locations are common DC challenges, especially when some items are perishable or have unique

handling requirements. Momentum provides intelligent order planning and release to make sure products from various locations arrive at the shipping dock at the same time. By taking all aspects related to discrete order fulfillment into consideration — such as labor and workstation availability, product attributes, value-added services, product travel routes and DC congestion — Momentum prioritizes and escalates orders to meet service level agreements (SLAs).

#### **AS/RS SYSTEM AUTOMATION**

Many companies are introducing AS/RS to reduce labor requirements, avoid capital expansion, and lay the foundation for greater long-term productivity. Momentum integrates with modern AS/RS solutions to open up a new world of automated workflow possibilities.

For example, Momentum evaluates cartons of varying sizes to determine the best locations to store them within the AS/RS array, rather than constraining those decisions to fixed locations. Instead of creating locations based on the largest carton size, which leads to wasted space when smaller cartons are stored, Momentum makes storage decisions based on carton profiles and the available space within an array. This dynamic, intelligent decision making maximizes utilization of the storage capacity in the AS/RS.

Another example of AS/RS capabilities with WES is the ability to completely automate reserve and active storage for store replenishment. Here, retailers can use an AS/RS crane system for storing pallets of reserve stock in conjunction with an AS/RS shuttle system for maintaining active inventory. In this scenario, a host system or WMS sends a wave of orders and then hands off to Momentum for execution.

Then, Momentum aggregates demand by specific items to determine the best sources of allocation to achieve maximum throughput. Smaller quantities are fulfilled from residual inventory while large quantities are sourced by pulling full pallets from bulk storage via the AS/RS crane system. Pallets are then routed to available automatic depalletizing stations so that cases can be shipped as needed. Finally, Momentum gives the depalletizer instructions to de-layer the pallet, and cartons are placed on a conveyor for sorting and routing to individual stores.

#### **AS/RS GOODS-TO-OPERATOR ROBOTIC EACH PICKING TO SORTER**

To improve picking accuracies and reduce labor touches, some fulfillment centers are increasing automation at goods-to-operator (GTO) stations with the addition of robotic picking capabilities. By pairing this technology with an AS/RS, WES instructs the system to bring a tote of single-SKU items to the robotic picking station based on order demand. Then, it sends pick quantity and placement instructions to the robotic arm, telling it to either place items directly into an order carton or onto a unit sorter for fulfillment.

For a fully automated fulfillment workflow, Momentum can even pair a shuttle for a more efficient chute-closing process at a sorter. Instead of employing a manual, labor-intensive, chute-closing process typically

completed within the WMS via an RF hand-held device, this process transfers completed orders to a take-away conveyor and makes the chute available for the next demand.

### JUST-IN-TIME PUT WALL ALLOCATION AND ORDER CONSOLIDATION

Put walls have become integral tools for order consolidation in automated DCs, and Momentum expands their utility. By taking a real-time view of order prioritization and put wall availability during upstream picking, Momentum allocates orders to the best-available put wall. Using put walls with a WES combines the benefits of wave picking with just-in-time cubby assignment for increased through put and decreased put wall congestion.

### THE GROWING IMPORTANCE OF WES

What these examples illustrate is that the more the industry moves toward automation, the more a comprehensive solution like WES

is needed. Whether providing smart workflow allocations based on available capacity or instructing order consolidation processes like put walls or unit sortation, WES integrates automation technologies to make real-time order fulfillment and execution decisions.

At Honeywell Intelligrated, we manufacture both distribution hardware and software for optimum system integration. In addition, Momentum is built upon a unified, stable software platform to reduce integration complexities while offering clear upgrade paths and the extensibility to meet unique workflow and business requirements. Our WES capabilities will continue to grow to include inbound logic capabilities related to receiving, put-away, inventory management and advanced real-time decision making through machine learning.

To limit the need for multiple software systems and their mounting integration complexities, DC operators are also seeking single-source systems that can accomplish all the order fulfillment tasks that have been traditionally siloed into WCS, WMS, transportation management system (TMS) and other distribution software.

As we continue to build upon our Momentum software platform — one that encompasses the traditional roles of the WCS and WMS — the potential for a single-source, greatly simplified warehouse is on the horizon. ■

## HONEYWELL INTELLIGRATED // INSIGHTS

<https://www.intelligrated.com/en/resources/blog>

Subscribe to the Insights Blog now to read about the latest topics in the material handling industry from experts in the field! Get notified when new blogs around the latest topics are available from experts in the field!

### RECENT BLOGS:

**Top 10 Honeywell Intelligrated YouTube videos for 2018:** Lights, camera, knowledge!

**Ready for the DC:** Rosie the Robot 2.0

Don't let your DC be the Grinch that stole Christmas

**The time is now:** Why DCs are primed for big robotics growth

The time is right for smart glasses in DC maintenance operations



BLOG BY  
TRACY NIEHAUS



BLOG BY  
MIKE KELTON