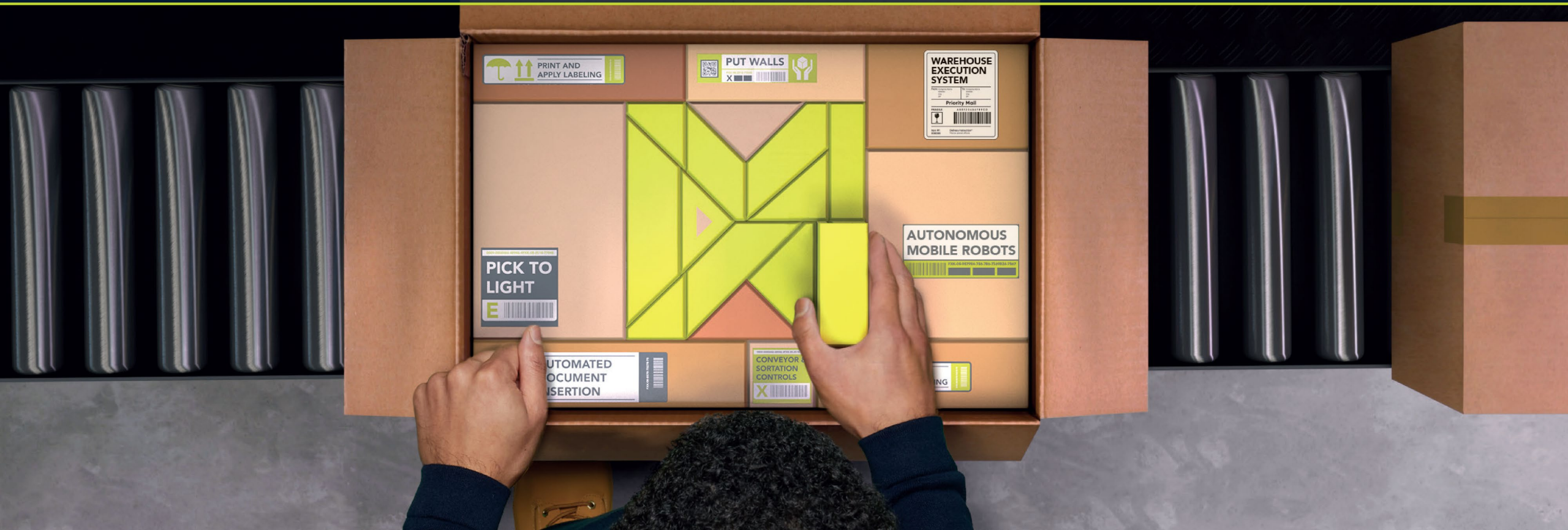
5 Questions (and Answers) About Warehouse Execution Systems

LEARN WHAT A WES CAN DO FOR YOUR OPERATION

Matthews®
AUTOMATION SOLUTIONS



INTRODUCTION

As Warehouse Execution Systems (WES) continue to become more widely adopted for material handling applications, some questions remain.

Although the terminology may be new, for some, the functionality of a WES is not. Many of the functions now packaged as WES have been available from traditional WCS providers for years.

In this e-book, we'll answer some of the most common questions we've been asked about WES, and help you determine what a WES can do for your operation.

DEFINITIONS

WMS, WCS and WES Tiers of Functionality Defined...

Warehouse Management System (WMS): Transactional software that tracks, analyzes and coordinates inventory, orders and customers, combining their data inputs to direct fulfillment processes. Capabilities include direction of conventional handling tasks, such as receiving, putaway, pick face replenishment and batching or waving for picking.

Warehouse Control System (WCS): Operational software that connects automated systems, such as conveyors, sorters, automated storage and retrieval systems (AS/RS), and light- and voice-directed picking. By communicating with the equipment's programmable logic controllers (PLCs), a WCS triggers its operation to support material flow.

Warehouse Execution System (WES): Performance optimization software that sits below a WMS and encompasses a WCS. It utilizes sophisticated algorithms to leverage real-time inputs from all automation (including order finishing, manifesting and other sources), as well as data from inventory, order, labor, transportation and other activities. With a WES in place, a distribution center's operations can be optimized and dynamically managed, end-to-end.

Typically offered as a packaged, modular solution built upon standard, pre-written code, a WES includes a broad array of options that are configured upon installation. This allows users to implement only the functionality they need—and to avoid costly, operation-specific software customization. The ideal WES integrates with all commercially popular WMS brands and includes built-in control capability to interface with any semi- or fully-automated material handling system from any original equipment manufacturer (OEM).

QUESTION # 1 What are the capabilities of a WES?

A WES acts on information from both a WMS and WCS, orchestrating operations to more deftly tackle today's high-level fulfillment challenges.

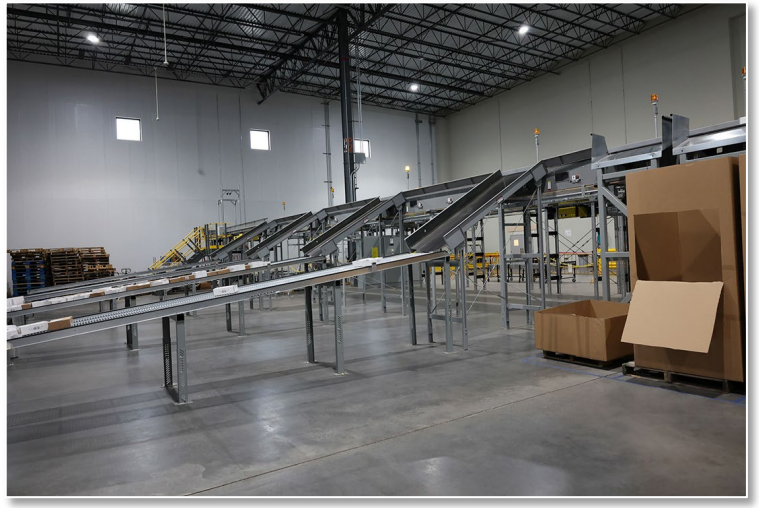
A robust WES should have the following capabilities:

- Examination of WMS order data to continuously prioritize and sequence workloads across all the automation in a facility, keeping operators and equipment working at a steady, continuous flow throughout receiving, replenishment, picking, conveying, sorting, packing, order finishing and shipping.
- Facility-wide integration and orchestration of all material handling systems—conventional, semi-automated or automated—for coordination and continuous reallocation of work against available capacity, including equipment status and actual resource availability.
- Fluid unloading of inbound inventory, automatically checked-in and reconciled against advance shipping notices (ASNs), or blind receipts acknowledged as either purchase order (PO) or stock keeping unit (SKU) items with camera-based data entry.
- Optimized release of orders to accommodate compressed cycle times and the order variety common to omnichannel fulfillment operations for picking, packing, value-added service operations, and order finishing of cartons and/or bags prior to shipment.

QUESTION # 1 What are the capabilities of a WES?

- Applies complex sorting algorithms at high speeds for dynamic balancing and optimizing of order building at sort locations and/or chutes in real-time for loop sorter and put wall users.
- Optimized inventory selection from manual selection areas (pick modules) and automated storage and retrieval systems (AS/RS)—including shuttle and crane-based equipment, vertical lift modules (VLMs), and/or horizontal and vertical carousels to maintain balanced flow. Additionally, storage systems can be utilized for staging and automatic release of tasks between workflow areas.
- Integration and management of highly specialized automated order finishing equipment, including auto-boxing and auto-bagging of outbound product, automatic print-and-apply labeling, custom packing list printing and insertion, and collateral insertion.
- Automatic identification, weighing, dimensioning and sorting of outbound orders based on pre-determined algorithms and freight optimization specifications. The system automatically verifies product at the docks, nimbly manifests it and loads it onto a trailer.
- Maximized uptime via identification of performance anomalies to identify and detect trends in automated equipment use. That information can be used to proactively schedule preventive maintenance or signal potential failures.
- Interfaces to or manages autonomous mobile robotics (AMR) fleets to enhance labor for goods-to-person picking, sorting, and material movement applications.

QUESTION # 2 With what types of automated equipment does a WES interface?



The ideal WES includes WCS functionality to integrate with the control technologies (such as AB/Rockwell) utilized in a variety of automated material handling equipment and ancillary technologies, including:

- **Conveyors:** Accumulation, belt and live roller. Typically, WES software interfaces directly to the machine controls.
- **Sorters:** Loop sorters (bomb bay, cross belt, tilt-tray), rope-based garment on hanger (GOH), pop-up wheel, shoe, swivel wheel, tilt-tray, multi- and split-belt, swing arm/bat, transfers, and more. Typically, WES software interfaces directly to the machine controls.
- **Induction Merges:** High-speed servo and variable frequency drive (VFD), slug build and release, inverters, saw-tooth, case, singulators and gap optimizers. Typically, WES software interfaces directly to the machine controls.
- **Automated Fulfillment and Picking Systems:** Pick-to-light, put-to-light, put-walls, pack-to-light, picking carts and other paperless picking, kitting, assembly and sortation systems. Typically, this functionality is integrated within the WES, however external interfaces are supported.
- **Robotics:** Autonomous mobile robotics (AMRs), robotic arms, goods-to-person picking systems.

QUESTION # 2 With what types of automated equipment does a WES interface?

- **Automated Storage & Handling Systems:** Automatic guided vehicles (AGVs); automated storage and retrieval systems (AS/RS); horizontal and vertical carousels; vertical lift modules (VLMs); fluid loaders and unloaders; robotic and conventional palletizers and de-palletizers; and trolley-based garment on rail systems. Typically, the automated storage system manages its inventory at a micro level, while the WES manages inventory at a macro level (everything within the facility). A WES utilizes inventory data from automated storage systems in a variety of ways, depending on the operation's requirements.
- **Order Finishing Systems:** Product bagging and boxing; print-and-apply labeling; and document insertion of catalogs, coupons, special offers, shipping information or other customer-specific materials. Typically, WES interfaces directly to the printers and controllers managing the equipment.
- **Automatic Identification and Data Capture (AIDC) Technologies:** Vision, scanners, dimensioners, check weighers, marking and coding systems. Typically, the WES interfaces to an external controller (usually PLC-based) that is utilized to coordinate data and container movement on the material handling equipment.

QUESTION # 3 What types of processes does a WES enable?

By integrating with the WMS' higher-level order fulfillment view and the WCS' intelligence on actual operational function, utilization and status, a WES can automate and optimize a variety of processes and tasks without human intervention, and in real-time. These include:

- Reallocation and redistribution of work to prevent bottlenecks
- Automatic triggering of pick-face replenishment, prompted by real-time updates of WMS inventory
- Release of orders in a continuous flow
- Execution of cycle count triggers within conventional and automated storage systems
- Automated exception management and diagnostic tools

QUESTION # 3 What types of processes does a WES enable?

- Comprehensive views of workflows, with individual status and location by handling unit, wave or batch
- Ensure a high degree of accuracy in item and parcel routing, identification and manifesting
- Continuous measurement and reporting of all key operations metrics
- Workflow dashboard views
- Delivery of business intelligence and key performance indicator (KPI) analysis via dashboards
- Up-to-the-second graphical visibility into equipment status/performance
- Predictive analysis via correlation of inventory and equipment status to anticipate shortages or maintenance needs
- Manages fleets of AMRs

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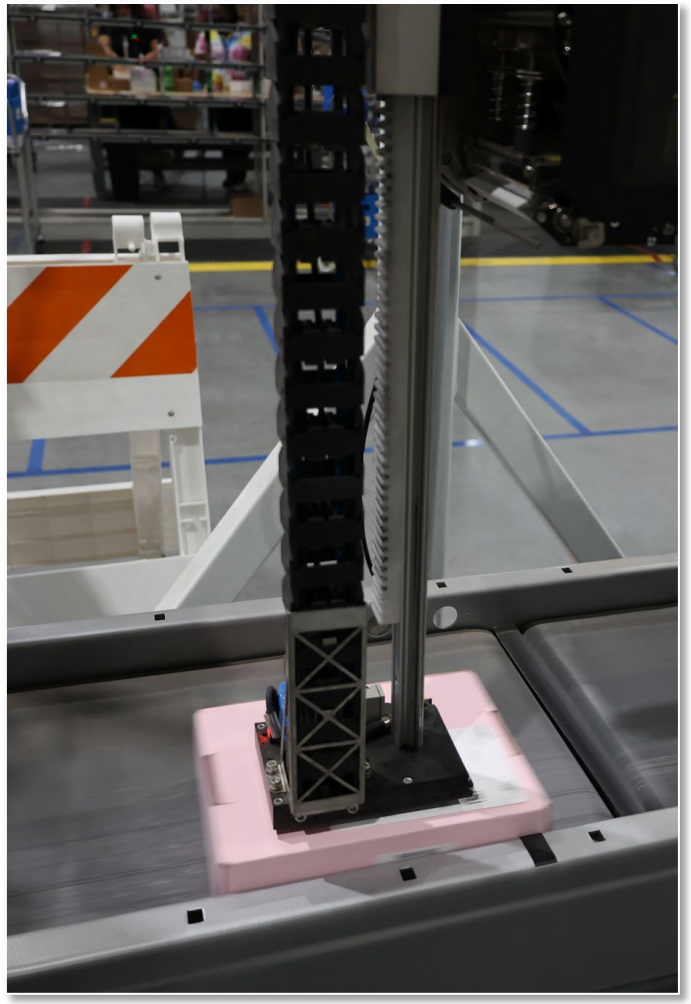
QUESTION # 4 What types of operations will benefit the most from a WES?



A variety of operations can benefit from the enhanced operational visibility and real-time optimization of order fulfillment processes delivered by a WES. These include:

- Distribution centers that utilize multiple types of automation
- E-commerce retailers of consumer and industrial products
- Third-party logistics (3PL) service providers
- Omni-channel fulfillment operations that serve e-commerce customers, retail store replenishment and wholesalers
- Operations struggling to keep up with higher order volumes and rapid processing of thousands of small, one- and two-line orders
- Manufacturers that maintain and receive component parts inventory for just-in-time lineside delivery
- Facilities with Lean initiatives via dynamic sequencing and induction of work to support flexible order prioritization based on service level demands and labor accessibility
- Operations prone to out-of-balance workflows, through real-time monitoring in-process tasks and redistribution of work on-the-fly from an overtaxed area to an underutilized one
- Microfulfillment, Reverse Logistics (Returns)

QUESTION # 5 How will NEXUS WES benefit my operation?

Matthews NEXUS WES can synchronize and streamline complex operations—particularly those in high throughput, sophisticated order fulfillment facilities serving omni-channel and direct-to-consumer retailers.

NEXUS WES translates inputs from an operation's information systems—including WMS and enterprise resource planning (ERP) systems—with sophisticated algorithms to receive and process orders. It then synchronizes and directs multiple, disparate automation technologies via an integrated material handling equipment (MHE) WCS. The result is cohesive system management, balanced continuous workflows and coordinated control of different systems to enhance order flow, accuracy and fulfillment speed.

Utilizing integral, real-time decision engines embedded within the NEXUS WES software and controls, the system optimizes automated processes, such as: product flow, storage, retrieval, picking, sorting (including putwalls and loop sorters), order processing, packaging, packing slip printing/inserting, shipment labeling and shipment of inventory. It then intelligently integrates those processes at all points within an operation. Because NEXUS WES removes silos of data and automation for better order fulfillment execution, it is ideal for multi-channel order fulfillment operations that require advanced organization across disparate technologies in order to accomplish complex order distribution processes.

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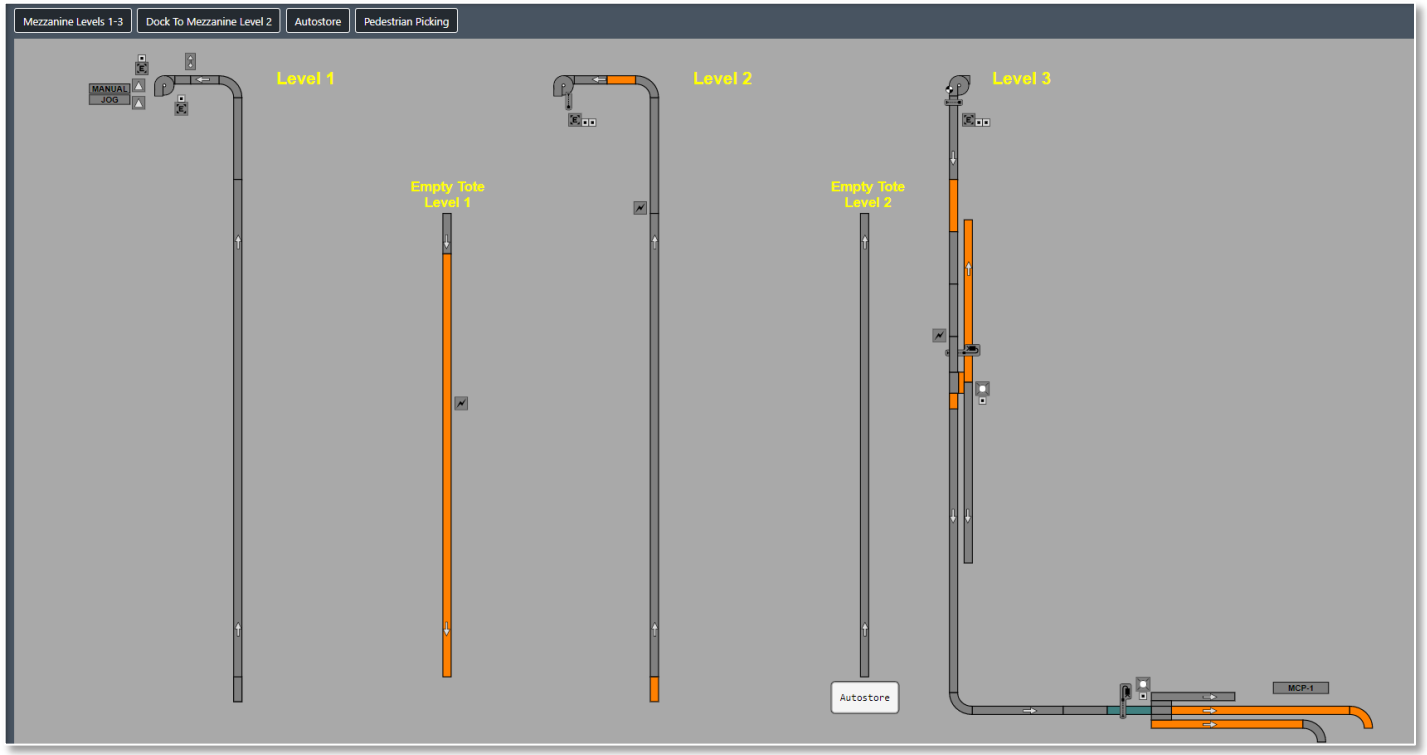
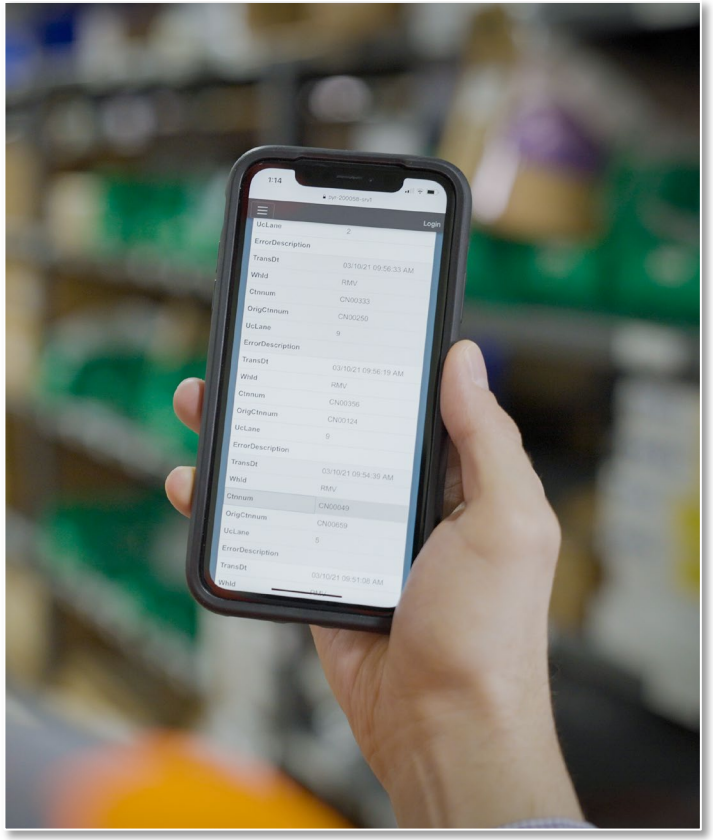


With a proven history of interfacing with virtually every commercially-popular WMS and ERP brand, NEXUS WES has successfully supported operations utilizing Manhattan, Körber, JDA, Oracle, SAP, Softeon and Infor, as well as custom, home-grown and other systems.

Simultaneously, NEXUS WES incorporates direct control functionality to optimize efficiency and performance across a broad range of material handling automation and order finishing systems. Further, NEXUS WES provides managers and supervisors with valuable, real-time visibility into critical operations and key performance indicator (KPI) data via dashboards.

About Matthews Automation Solutions

Global brands partner with Matthews Automation Solutions for innovative material handling technologies and proven vertical industry expertise. Matthews' best-in-class warehouse automation brands – Compass Engineering, Lightning Pick and Pyramid– deliver agile, integrated applications. Our recognized picking systems, including pick-to-light, put walls and picking carts, drive speed and accuracy in order picking and order sortation tasks. Advanced Warehouse Execution Software integrates and synchronizes islands of automation and balances work for optimum throughput, material flow and real-time process visibility. Combined with autonomous mobile robots (AMRs), collaborative robotics and other state-of-the-art technologies, Matthews delivers innovative systems that maximize your order fulfillment processes today, and tomorrow.



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