MOMENTUM™
WAREHOUSE
EXECUTION
SYSTEM

Honeywell

Intelligrated®

WAREHOUSE EXECUTION. SIMPLIFIED.

Every day, your fulfillment requirements become more complex. As customer expectations rise and cycle times get shorter, your business is under continuous pressure to meet delivery schedules and protect profit margins. As you look for ways to improve efficiencies, automate manual processes and fully optimize fulfillment operations, you're left with an exceedingly complex environment.

Momentum™ is a full-featured warehouse execution system (WES) designed to greatly simplify e-commerce fulfillment, store replenishment and wholesale distribution center operations. Realizing the full promise of a WES, Momentum is built on a single software platform to reduce unsupportable, one-off customizations and allow you to select only the functions you need to meet your unique operational requirements.

PURPOSE-BUILT FOR MODERN RETAIL REQUIREMENTS

As the industry's only clean-sheet approach to WES software, Momentum incorporates multiple warehouse functionalities into a common code base. Through seamless integration of sensors, controls, automation, orders and labor, Momentum connects DC workflows to give you real-time order fulfillment status and greater visibility to in-process work.

Momentum is purpose-built for modern retail challenges, offering unparalleled configurability, stability and extensibility to help you run your operations the way you know best. Regardless of your current automation requirements or long-term objectives, Momentum allows you to boost productivity within your current operation while effortlessly scaling with the demands of the future.

Most importantly, Momentum simplifies complex fulfillment operations via a central platform for running, coordinating and managing every aspect of your operations, while equipping your business with the intelligence to make informed decisions based on real-time data.

MATCH THE SPEED OF COMMERCE

Whether your business is focused on e-commerce, retail replenishment or wholesale distribution, the speed of commerce is driving up fulfillment complexities. As traditional retailers enter the e-commerce arena, consumers expect nothing less than the same service levels they would receive from online retail giants. For fulfillment operations, this means:

- Shorter delivery windows and cycle times

- More demanding service level agreements (SLAs)

- Increasing variety of SKUs, order profiles and seasonal demands

Honeywell Intelligrated understands that while retailers share these challenges, each has unique requirements, infrastructures and fulfillment workflows. And as labor shortages, costs and productivity challenges persist, many operators are introducing increasing levels of automation to meet online order volumes.

Regardless of where you sit on the spectrum of automation, Momentum is designed to address these challenges and remove the complexities of order fulfillment within the four walls of the DC through:

- Incisive visibility to orders in process

- Seamless connection with host systems and fulfillment processes

- Integration with disparate material handling equipment and automation systems

- Real-time allocation of resources to meet demand

A SINGULAR FOUNDATION FOR SUCCESS

Momentum offers retailers an alternative to the patchwork of multiple vendors, separate controls and stranded islands of automation. Gone are the headaches of supporting complex, customized configurations with limited growth or expansion potential.

Instead, Momentum gives you the power to add new automation systems, functions and processes as the business dictates — all within the same platform and without requiring customization to the base code. Benefits of this approach include: enhanced workflow and process integrity; maximum uptime of equipment/automation; and a WES that can adapt and grow with your requirements.

And for those struggling to manage multiple MHE vendors with disparate control systems within your operations, Momentum allows you to standardize your IT infrastructure into one consolidated system and interface.

GAIN THE MOMENTUM YOU NEED

OUR APPROACH:

- Deliberate, clean-sheet approach to WES

- Standardized platform delivers stability and reduces customization complexities

- Connects DC workflows for real-time status and increased visibility to in-process work

- Purpose-built with functional modules that scale to your requirements

- Flexible host and automation system integration protocols

- Predictable upgrade paths and revision roll-outs

- Simplifies operations by coordinating every aspect of the DC

BENEFITS TO YOU:

- Maximum fulfillment flexibility

- Improved equipment and space utilization

- Increased throughput and labor productivity

- On-time shipments with improved order accuracy

- Reduced labor costs and requirements

- Shortened cycle times and faster deliveries

- Fewer customer returns and complaints

POWERED BY MOMENTUM

From receiving to shipping and everything in between, Momentum serves as the one system to seamlessly run, manage and coordinate fulfillment operations within the four walls of the warehouse. Let's take a look at some examples.

DYNAMIC SPACE STORAGE VIA AS/RS SHUTTLE

Too often, facilities squander the potential storage capacity of their automated storage and retrieval system (AS/RS). Momentum can dynamically match product size and shape attributes to available locations in the AS/RS shelving system, providing:

- Increased storage density and capacity of the existing footprint
- Automated dynamic location assignment based on product size and space availability
- Accommodate variable SKU sizes without changing the square footage

INTELLIGENT ORDER RELEASE BASED ON CAPACITY, DELIVERY TIME, CONGESTION AND LABOR

Many fulfillment centers have difficulty consolidating and shipping orders comprised of products from varying locations and unique handling requirements. Momentum drives intelligent order assembly and release — taking labor availability, product attributes, value-added services and travel routes into consideration — to make sure products arrive at the shipping dock at the same time. Benefits include:

- Prioritize and escalate orders to meet SLAs
- Reduce congestion, bottlenecks and overloading

JUST-IN-TIME PUT WALL ALLOCATION AND ORDER CONSOLIDATION

Put walls have become integral tools for order consolidation, but many execution systems can only monitor complete waves and can't release individual orders based on put wall location availability. Momentum allocates demand based on real-time put wall availability data to:

- Increase throughput while decreasing congestion
- Coordinate order picking with put wall station availability
- Combine the benefits of wave picking with just-in-time location allocation

HIGH-DENSITY PICK AND PUT VIA LOCATION SIZING AND CONFIGURATION

In most operations, pick faces and put walls are part of a fixed framework, regardless of changing product sizes or seasonal order demands. What if this framework was flexible and capable of being configured to accommodate specific product and order sizes, and equipped with configurable light-directed hardware? With Momentum, this is a core operating principle, allowing you to:

- Maximize space utilization for high-SKU density
- Accommodate variable SKU sizes without changing the square footage
- Respond to changes in order profiles

AUTOMATED SORT AND SHUTTLE ORDER CONSOLIDATION

Order consolidation is an essential step in the fulfillment cycle that's too often managed by inefficient manual workflows, where the only way to increase throughput is to add labor. But with lag time between orders and multiple manual touches for each chute closing, the opportunities for errors and wasted time from idle workers can be costly. Momentum significantly reduces labor requirements, inefficiencies and errors associated with order consolidation by employing a patent pending sorter and shuttle retrieval system:

- Reduces manual labor requirements via automated order consolidation, chute closure and take-away
- Increases throughput and order accuracy rates
- Delivers optimal product consolidation via demand-based sorter allocation

GOODS-TO-OPERATOR WORKSTATIONS (MULTIPURPOSE TASKS, WORK PRIORITIZATION AND DYNAMIC ROUTING)

Modern distribution operations can't afford to blindly push work to operators without visibility to their workstation capacities, task lists or skillsets. Momentum eliminates these inefficiencies with intelligent workflows that release work to available, qualified workers and enables them to interleave multiple tasks for maximum productivity. Benefits include:

- Effectively managing workstation tasks, balancing demand while reducing congestion
- Reducing workforce, maximizing space utilization, and accelerating processing times
- Allowing operations the ability to assign tasks in real time based on labor availability

MOMENTUM OPERATIONS CENTER

- **KPIs**
- **Real-time monitoring of orders and work in process**
- **Alert monitoring of events, equipment status, trends**

Task filter

Order plan timeline

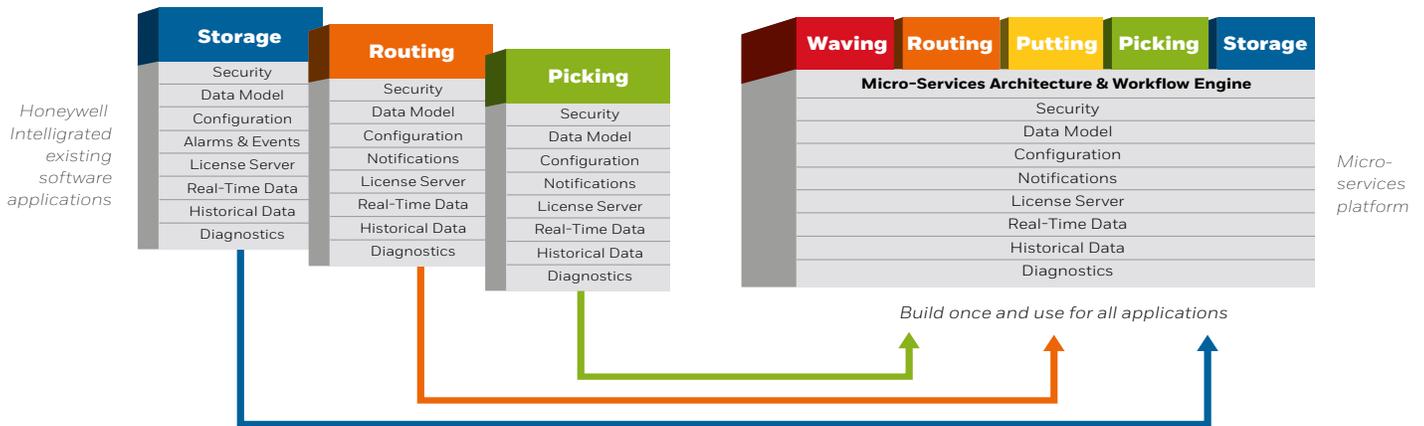*Orders tracking*

Picks by user

Wave view

GTO execution

SYSTEM OPERATING REQUIREMENTS

Momentum is built on the following technologies and software development frameworks:

- Certified Windows/ SQL server and Linux/ Oracle stack — enables access through leading internet browsers

- Microservices methodology — provides reliability, scalability and flexibility through a containerized deployment approach

- Industry-proven JAVA, Spring and Hibernate technologies — support continual upgrades to the platform and use of the most current technology

- Agile Scrum development methodology — employs modern best practices for timely iterations and feedback, resulting in higher efficiencies and faster time-to-market with new features

Storage
Security
Data Model
Configuration
Alarms & Events
License Server
Real-Time Data
Historical Data
Diagnostics

Routing
Security
Data Model
Configuration
Notifications
License Server
Real-Time Data
Historical Data
Diagnostics

Picking
Security
Data Model
Configuration
Notifications
License Server
Real-Time Data
Historical Data
Diagnostics

Honeywell Intelligrated existing software applications

Waving	Routing	Putting	Picking	Storage
Micro-Services Architecture & Workflow Engine				
Security				
Data Model				
Configuration				
Notifications				
License Server				
Real-Time Data				
Historical Data				
Diagnostics				

Micro-services platform

Build once and use for all applications

SEAMLESS HOST CONNECTIVITY

As the platform's built-in integration and interface tool, Momentum Connect is designed to ensure flexible connectivity to host systems, equipment and automation controls. By connecting the host system and the DC network, Momentum delivers a standardized messaging interface for everything from orders, products and locations to containers and business events. Momentum Connect enables:

- Seamless integration with leading host systems for connection to customer orders

- Forward and backward compatibility with automation systems and MHE controls

- Reduces risk associated with custom interface creation

- Ability to extend system capabilities as the business dictates

EQUIPMENT AND HARDWARE NEUTRALITY

One of the core principles of Momentum's modern software architecture is its compatibility with a wide variety of material handling equipment and their controls. This is achieved through the platform's hardware abstraction layer — an innovative integration protocol that allows for unlimited extensibility — or the ability for the system to extend its functionality — without customizing the base code or compromising stability.

- Enables integration with multiple types of MHE and controls

- Preserves code base and reduces customization complexities

- Delivers enhanced performance when coupled with Honeywell Intelligrated MHE

FORWARD-LOOKING, SCALABLE ARCHITECTURE

From an architecture standpoint, Momentum's clean-sheet approach to software development takes full advantage of modern technologies and their future potential. We designed the application to be horizontally and vertically scalable — allowing you to add users and servers to increase throughput or connect to the cloud for data analytics — without the hassle of customization and its associated complexities.

Momentum is the cornerstone of a next-generation fulfillment infrastructure that delivers on the realization of the industrial internet of things (IIoT) connectivity, machine learning and artificial intelligence. It starts with connecting DC assets through machine-level sensors that monitor system health and capture performance data. Then, through Honeywell Sentience, a cloud-based IIoT platform, this data is transformed into insights that give businesses the operational intelligence to make informed decisions about how to drive efficiencies and improve profitability.
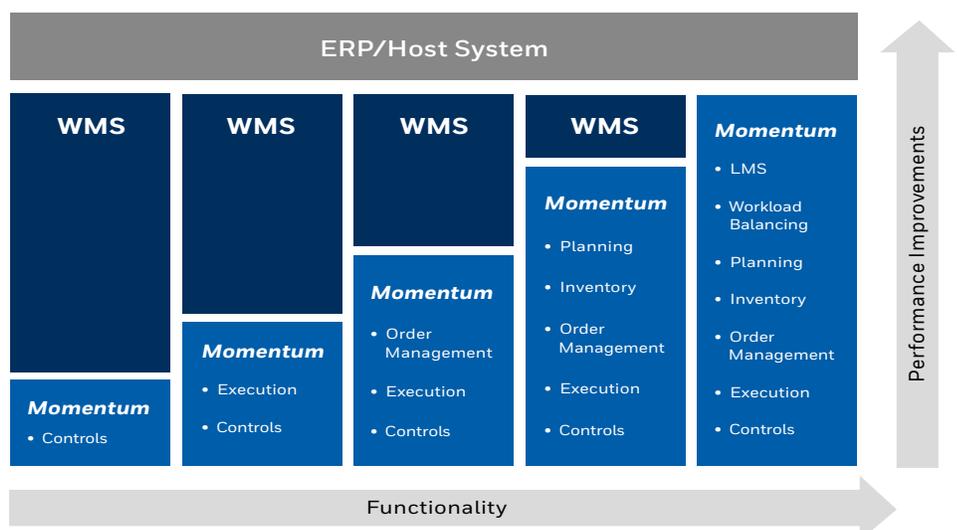
Together, these tools will isolate problem areas and prevent downtime while delivering unprecedented service levels, throughput and performance gains. And, as your DC evolves to incorporate higher levels of automation, Momentum can help you make the transition to increasing levels of process sophistication and warehouse automation.

MOMENTUM SCALABLE WAREHOUSE EXECUTION SYSTEM

ERP/Host System

WMS	WMS	WMS	WMS	*Momentum*
				• LMS
			Momentum	• Workload Balancing
		Momentum	• Planning	• Planning
	Momentum	• Order Management	• Inventory	• Inventory
Momentum	• Execution	• Execution	• Order Management	• Order Management
• Controls	• Controls	• Controls	• Execution	• Execution
			• Controls	• Controls

Performance Improvements

Functionality

THE CONNECTED DISTRIBUTION CENTER

The pace of change in modern commerce is putting tremendous pressure on fulfillment operations. To stay competitive and protect profits, companies need solutions that help them achieve maximum throughput, day-to-day flexibility, future-proof scalability and intelligence to make informed decisions.

The Connected Distribution Center helps companies make the digital transformation necessary to increase reliability, improve utilization and maximize productivity through:

- Intelligent, data-driven, high-speed execution

- Automated, adaptable processes for machines and workers

- Optimized utilization with the ability to seamlessly adapt and expand

- Insights and predictive analytics, from sensors to the cloud

**THE
FUTURE
IS
WHAT
WE
MAKE IT**

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MWEB | 02.20
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