



MANHATTAN ACTIVE™ DISTRIBUTION

Agile, Adaptable Solutions for a Changing Distribution Landscape

WAREHOUSES AND DISTRIBUTION CENTERS HAVE ALWAYS been a blur of activity. On any given day, there are products whizzing by on conveyor belts, trucks backing up to the loading bay, forklifts moving pallets from truck to floor to shelf, and associates picking and packing orders. In this environment, change is a constant factor, requiring well-choreographed operations to keep everything running smoothly and associates and equipment working at optimal efficiency.

E-Commerce Drives Growth in Facilities, Employees and Automation

With e-commerce, distribution networks stretch from suppliers' receiving docks to customers' front doors. And customer expectations around speed of delivery are changing the game. For this reason, more new distribution hubs are being built in closer proximity to customers¹ in order to handle e-commerce orders.

Many distribution centers that only handle store replenishment or wholesale distribution are retooling to support e-commerce. Along with facilities growth and new direct-to-consumer demands on traditional warehouses, the number of employees needed to staff operations is rising, too.

Just how much is e-commerce growing? While nearly 9 percent of sales are through e-commerce today,² McKinsey predicts that number will rise to 15 percent by 2025, when one out of every six sales will be via online and mobile channels.³ While we anticipate a high percentage of retail sales will still happen in brick-and-mortar stores, the tide is clearly shifting.

In response to rising e-commerce volume, the *Wall Street Journal* reports that "retailers and logistics companies have been opening warehouses at a record pace."⁴ It's not just the number of new warehouses and distribution hubs that are opening; the number of employees needed on a per-warehouse basis is rising, too. This is because fulfillment centers for smaller, direct-to-consumer orders require double to triple the number of workers compared to a typical warehouse due to the unique e-commerce order profiles.⁵

Improving Employee Engagement and Productivity

Factoring the number of fulfillment centers and demand for more employees to staff them with a falling unemployment rate, it becomes clear that productive employees are essential. In fact, the growth rate for warehousing jobs is outpacing job growth overall.⁶ Making new employees productive more quickly, and equipping supervisors with mobile technology to manage a growing workforce and keep them engaged, are imperatives for the modern warehouse.

Flexible Solutions that Stay Current

Manhattan's solutions are available across a variety of deployment options (public cloud, private cloud, managed/hosted, multi-tenant or on premise) to serve an array of needs, capabilities and budgets. As part of the Manhattan Active™ Supply Chain solutions portfolio, Manhattan Active Distribution solutions are available in a variety of deployment models, including options to receive annual upgrades. Annual upgrades allow you to implement the next version of an application each year so you can take advantage of new features and functions. Our Manhattan Active WM service provides annual upgrades both on premise and in the cloud, including the option to automatically migrate custom extensions.

Manhattan ACTIVE™ Distribution Suite

The Manhattan Active Distribution suite allows you to boost warehouse productivity, equipment utilization and employee engagement, with responsiveness to adapt to expected or unexpected demand changes. With distribution center technology that's as easy to use and as flexible as an app on a smartphone, you can get employees up to speed faster and help managers and supervisors be more effective.

The following pages provide more information about our solutions for Warehouse Management, Labor Management, Slotting Optimization, Billing Management and DM Mobile, along with industry-specific capabilities designed to increase product velocity, customer service and efficiency across operations.

"A compelling reason we opted to strengthen our partnership with Manhattan Associates: it's WMS is the most functional and commercially available system on the market. As we acquire new companies, there's a high probability that Manhattan's Warehouse Management is already in place. That allows for easier integration into our business processes."

– VF Corporation



Suite Components

Warehouse Management

Achieve Excellence in Omni-Channel Distribution

Manhattan's Warehouse Management sets the standard for leading-edge, highly-mobile warehouse management system (WMS) technology and innovation—in both cloud and on-premise solutions.

Using advanced, proprietary algorithms to mathematically organize and optimize operations, Warehouse Management speeds the flow of goods and information to enable flawless execution across inventory, labor and space, and places companies on a firm footing for compliance with regulations and standards. Our modern mobile applications help customers efficiently manage omni-channel fulfillment by converging capabilities commonly found in disparate labor management and slotting optimization systems.

With our industry-leading Warehouse Management solution your team has the power to:

- Enhance inventory management by increasing accuracy, improving order fulfillment and reducing order cycle time
- Streamline receiving and shipping to facilitate cross-docking and expedite back-ordered products
- Engage with floor personnel while seeing real-time performance visibility
- Increase inventory turns and speed order processing to boost customer satisfaction and improve financial performance

Warehouse Management Core Capabilities

Designed to help you exceed customer expectations in the omni-channel marketplace, our Warehouse Management solution maximizes efficiency and optimizes the potential of every fulfillment center. The solution advances your warehouse operations from beyond basic picking, packing and shipping, to speeding up the flow of goods and information through your warehouse and enabling flawless execution of all warehouse operations.

Features + Functions

- Streamline inventory receiving processes with cross-docking, quality audit and vendor performance
- Eliminate costly physical counts with auditor-approved, cycle-counting functionality
- Support sophisticated warehousing needs, including value-added services, lot management, serial number tracking and product recalls
- Accommodate omni-channel and/or multi-tenant fulfillment
- Leverage advanced fulfillment logic for wave management, constraint-based selection, real-time replenishment and advanced order cartonization
- Automate information capture via radio frequency (RF), voice and material handling equipment (MHE) technologies
- Utilize integrated transportation execution, including freight bill reconciliation, zone skipping/less than truckload (LTL) pooling and rate shopping

Warehouse Management Capabilities by Industry

Industry-specific capabilities are purpose-built to help you increase product velocity, customer service and efficiency across your distribution operations.

Food Distribution and Grocery Retail

- **Traceability**
 - Lot management
 - Inventory recall
 - Event tracking
 - Date rotation
 - Fast flow for perishables
 - Product aging, including First Expire First Out (FEFO), First In First Out (FIFO) and Last In First Out (LIFO)
 - Food Safety Modernization Act (FSMA) compliance
- **Food Picking and Loading Functionality**
 - Multi-order pallet and work assignment creation
 - Picking using label, RF and voice
 - Load sequence by stop/route
- **Multi-Temperature Distribution**
 - Locating, allocation and picking rules by zone (dry, fridge and freezer)
 - Task prioritization by zone
- **Inventory Control**
 - Real-time visibility into product status, product aging and lots
 - Advanced cycle counting
- **Appointment Scheduling and Yard Management**
- **Slotting, Labor Management and Real-Time Alerting and Reporting**

Retail

- **Cross Docking**
- **Flow Through**
- **Transloading**
- **Value-Added Services**
- **Vendor Compliance**
- **Put-to Zone and Put-to-Store**
- **Pre-Pack**
- **Kitting**
- **Dye-Lot Management**
- **Floor-Ready Processing**
- **Garment on Hanger (GOH) Support**
- **SKU Substitution**
- **Pack and Hold**
- **Load Building**
- **Directed Loading by Stop**



Direct to Consumer

- **High-Volume Piece Pick**
- **Singles Processing**
- **Multiple Pick Methods (Cluster Picking and Zone Pick)**
- **Personalization (Gift Cards, Gift Wrap, etc.)**
- **3D Cartonization**
- **Collate (Invoice) Document Generation**
- **Configurable Material Handling Integration**
- **Dynamic Replenishment**
- **Returns Disposition Processing**
- **Product Assortments (Gift Packs)**
- **Advanced Slotting Optimization**
- **CubiScan Cubing, Weighing and Dimensioning System Integration**

Apparel and Footwear

- **Apparel SKU Characteristics**
 - Style, color, size and width tracking
 - Quality and version support
 - Release date support
- **High SKU-Count Support**
 - Scalability
 - Item placement/slotting
- **Flexible Dimension and Weight Support**
 - Advanced cartonization algorithms
 - CubiScan cubing, weighing and dimensioning system integration
- **Pre-Packs/Musical Runs**
- **Value-Added Services**
- **Native Parcel and Shipping System (included in WMS)**
- **Configurable MHE Integration**
- **Advanced Outbound Allocation, Picking and Replenishment Strategies**
- **Pack-and-Hold Storage**

Life Science

- **Traceability**
 - Lot management
 - Inventory recall
 - Event tracking
 - Date rotation
 - Product aging, including FEFO, FIFO and LIFO
- **Life Science Picking and Loading Functionality**
 - Multi-Order case or pallet and work assignment creation
 - Picking using label, RF and voice
 - Load Sequence by stop and route
- **Multi-Temperature Distribution**
 - Locating, allocating and picking rules by zone (cage, fridge, dry, etc.)
 - Task prioritization by zone
- **Inventory Control**
 - Real-time visibility to product status, product aging and lots
 - Advanced cycle counting
- **Appointment Scheduling and Yard Management**
- **Slotting Optimization, Labor Management and Real-time Alerting and Reporting**



High-Tech Electronics

- **End-to-end serial number tracking**
 - Multi-level/nested serial numbers
 - Serial number range capture
 - Level of tracking controlled at SKU level
- **Advanced lot management**
- **SKU attribute management**
 - Revision number
 - Country of origin
- **Work Orders/Kitting and Value Added Services**
- **Native Parcel and Shipping System (included in WMS)**
- **Advanced Cartonization**
- **Configurable MHE/Voice Integration**
- **Advanced Outbound Allocation/Picking/ Replenishment Strategies**
- **Inventory ownership/ segregation (vendor-owned inventory)**

Third-Party Logistics (3PL)

- **Architectural Support**
 - Multiple warehouses on single application and database instance
 - Multiple customers in a single facility
- **Operational Flexibility**
 - Business flows configured at the company level
 - Support multiple flows within single warehouse
 - Configure storage to be company-specific or allow mixing of inventory across companies within single location, zone, etc. to optimize space
- **Optimize Labor Across Companies**
 - Ability to handle multiple companies with different operating rules within single facility without adversely affecting labor
- **Billing Management for Customer Charge and Invoicing Requirements**
- **Visibility Across Warehouses and Companies for Orders and Inventory**

The Gartner logo is displayed in white text on a dark blue background. To the left of the logo is a network diagram consisting of grey nodes connected by thin lines, extending from the bottom left towards the top right of the page.

Manhattan Associates Maintains Position as a Gartner WMS Magic Quadrant Leader for Ninth Consecutive Time, positioned highest in Ability to Execute and furthest in Completeness of Vision.

Waveless Order Streaming: A New Approach to Maximizing Throughput

At Manhattan, we are committed to helping our customers maximize overall facility throughput and more easily and cost-effectively flex their workforces during peak periods. At a high level, the key to maximizing throughput is to move from an exclusive reliance on traditional wave-based processes to one which blends waves and waveless strategies. That's why we offer non-wave-based math and science models that easily integrate with market-leading material handling equipment (MHE) such as sortation equipment, put walls and automated storage and retrieval systems (ASRS) for waveless order fulfillment.

This waveless order streaming approach is crucial for fully utilizing material handling equipment and meeting service-level agreements on direct-to-consumer (DTC) orders. Order Streaming provides a more dynamic order fulfillment model that orchestrates the majority of the orders immediately to improve labor and equipment planning and proactive location assignment and replenishment. At the same time, Order Streaming delays final task construction and assignment, including travel/pick paths, until the work is ready to be assigned to a work queue. The benefits are better utilization of unit sorters, more efficient manual sortation, higher utilized labor, more flexibility in order grouping and prioritization, and ultimately, a more scalable warehouse at a lower capital expense.

More Productive Picking

For warehouse associates, our mobile picking app provides a touch-enabled, modern approach to order fulfillment picking that focuses on maximizing the productivity of outbound fulfillment personnel in a consumer-oriented user interface. For tasks such as active pick, case pick, reserve pick, put to sorter, put to wall, put to cart/tote, etc., a diverse assortment of device form factors such as voice-driven, triggered scanners, wearable input devices, vehicle-mounted screens, and handheld touchscreens is supported. A visual user interface with product images and easy-to-follow prompts allows for rapid training and high pick accuracy.

Agility to Iterate and Innovate

As warehouses become increasingly more automated, Warehouse Management's ability to integrate with warehouse control systems (WCS) will add even greater value and efficiency. By leveraging the data explosion created by the Internet of Things (IoT), Warehouse Management advances fulfillment capabilities for both manufacturers and wholesalers. We are committed to omni-channel retail and distribution center innovation. Our solutions will take full advantage of fulfillment automation and machine learning, as well as agile for addressing an evolving, growing workforce.

E-Commerce Order Fulfillment: Pack Station, Returns Processing and Parcel Integration

Designed to address the unique challenges that retailers face in the world of omni-channel commerce, our pack station, returns processing and parcel integration capabilities increase efficiency and improve service.

Our **pack station** interface provides fully configurable screens that lead packing personnel through tasks using large, easy-to-use touchscreens with product images and robust exception handling. With the pack station capabilities, efficiency and accuracy of the packing process increases, while decreasing ramp-up time for new and temporary employees during peak periods.

While processing returns can be a time-consuming task that needs to be made as efficient as possible, a top-line opportunity also exists in returning this merchandise to sellable condition as quickly as possible. That's why our modern, **purpose-built returns processing** interface supports multiple initiation workflows and rapid inventory disposition with the goals of faster inventory recovery and more rapid customer credits.

With **parcel integration**—our optional, robust integration framework for third-party parcel connectivity—your team can rate, ship and track parcel packages with absolutely no rate and carrier label maintenance. Parcel integration

provides out-of-the-box integration with leading parcel carriers such as UPS, FedEx, USPS and regional carriers, as well as most international carriers.

Our pack station interface provides fully configurable screens that lead packing personnel through tasks using large, easy-to-use touchscreens with product images and robust exception handling.



A Complete Solution for Active Distribution

Leading companies have recognized Manhattan's Warehouse Management solution for delivering best-in-class performance for decades. And while we do provide the leading WMS with industry-specific domain expertise, effective distribution management is about more than just warehousing. Optimization tools like Slotting and Labor Management drive workforce efficiency—through facility layout, planning and management tools. Manhattan's solutions for these functions are covered in the pages that follow.

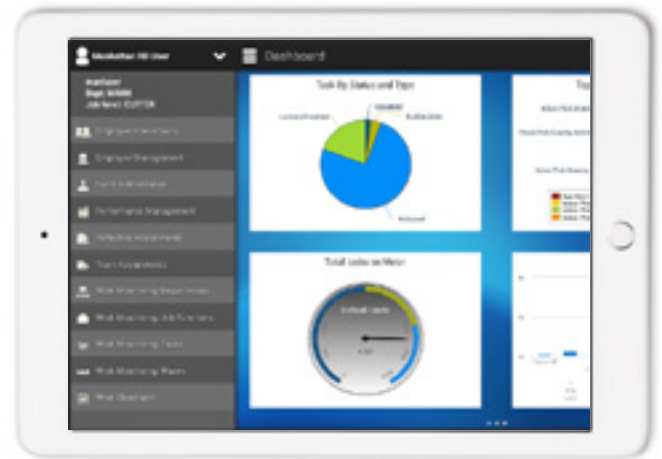


The Case for

MODERN MOBILE APPLICATIONS

for Managers and Associates

A recent survey of IT and operations professionals in the logistics, manufacturing, retail, transportation and wholesale markets revealed the three most critical picking and fulfillment issues: labor productivity, order turnaround time and order accuracy. In the world of omni-channel commerce, improving in these areas starts with quick, real-time access to information—not only for sharing, verifying and altering order fulfillment tasks and other time-sensitive data—but also for driving engagement and productivity among warehouse associates. To meet the needs of today, data must be delivered to associates and managers alike in a mobile format across warehouse management, inventory and slotting functions.



DM Mobile, the perfect tool for managers on the move.

DM MOBILE: THE POWER OF MODERN MOBILITY

DM Mobile overcomes labor productivity, order turnaround time and order accuracy challenges by providing managers and associates applications—via tablets and handheld devices—that provide information and capabilities essential for taking immediate action. Distribution managers can finally break away from the desk since DM Mobile gives them all the information they need to interact and affect change among employees and tasks in real time on the warehouse floor.

By combining data and functionality from Warehouse Management, Labor Management and Slotting Optimization solutions, DM Mobile offers a wide array of powerful capabilities. Labor management information, such as employee performance, observation management, team assignment and employee interactions, is readily accessible. In addition, work monitoring options like task monitoring, throughput, order prioritization, and customer views allow warehouse supervisors to keep customer service and operational efficiency top-of-mind and at their fingertips.

DM Mobile offers a comprehensive set of capabilities that are seamlessly interconnected with the Manhattan Active Distribution suite:

- **Labor Management.** DM Mobile equips supervisors with vital performance information necessary for real-time interaction with employees on the warehouse floor. The solution helps improve employee engagement by providing a system for identifying and rewarding strong performers while coaching employees who are not meeting their goals.
- **Work Monitoring.** Through an easy-to-use, consumer-oriented user interface, DM Mobile offers a work monitoring framework with multiple hierarchies for task management in all warehouse environments.
- **Inventory Management.** DM Mobile has a powerful capability to manage or interact with inventory directly from the warehouse floor. Warehouse managers can view or manage inventory using intuitive inventory searches by location, item or LPN. Inventory management provides warehouse managers real-time inventory data while moving throughout their facility and encountering current or potential inventory issues. Managers can make immediate inventory updates and even view slot score and re-slot locations.
- **Order Streaming.** DM Mobile supports order streaming, which dynamically adjusts picking priorities on-the-fly, and help keep labor resources and sortation equipment moving at a more regular pace, while reducing the amount of downtime for labor and sortation processes.

Features + Functions

- Facilitate more supervisor time spent on the floor with real-time data on employee productivity and performance
- Systematically record active interactions with employees, including observations and performance measurements
- Review work in the warehouse by wave, job function and task or activity
- Put a task on hold, reprioritize a task, assign a task to an employee or release a set of tasks to be completed
- Monitor, plan and forecast work in real time
- Track the status for a particular customer, including order lookups and wave progress

WHY DM MOBILE?

DM Mobile provides a single, seamless mobile application which allows warehouse managers to move throughout their facility and engage with floor personnel while having real-time information visibility. This industry-leading solution offers robust functionality and tight interconnectivity with Manhattan Active Distribution suite solutions, enabling distribution managers to manage labor, inventory and work in real time, even in the most complex facilities. Because it's anchored by our industry-leading warehouse management solutions, DM Mobile helps increase product velocity, customer service and efficiency across your distribution operations.

Labor Management

Achieving an Engaged and Highly Adaptable Workforce

High customer service expectations, volatile demand, SKU proliferation and smaller order sizes driven by omni-channel commerce require greater employee productivity and efficiency than ever before. Yet, according to Gallup Research, 70 percent of U.S. workers are not engaged and are not working to achieve their full potential. But in today's fast-paced economy, an engaged workforce is vital to success. It can lead to increased innovation, productivity and bottom-line performance while reducing labor costs.

Manhattan's Labor Management solution helps close the employee engagement gap by providing a system for identifying and rewarding strong performers while providing essential training and coaching for employees not meeting their goals. The result? Improved workforce efficiency, reduced turnover and increased productivity in the warehouse.

Labor Management also enables managers and supervisors to forecast workforce requirements, track productivity and calculate incentive pay. And as an intuitive mobile solution, supervisors can spend more time on the warehouse floor where they can interact with their teams, take real-time action to eliminate bottlenecks, work with low performers, and ensure operations are running smoothly.

Features + Functions

- Measure how staff is performing against engineered labor standards
- Use "what-if" analysis to determine optimal staffing requirements
- Forecast and plan labor by day, shift, job and zone
- Engage employees by giving them visibility into daily performance, peer comparisons and operational results
- Optimize overtime, regular and temporary labor based on demand forecasts
- Use mobile capabilities to facilitate more supervisor time spent on the floor with real-time data on employee productivity and performance
- Calculate incentive pay and feed into payroll systems

Boosting Performance at Work

While Labor and Warehouse Management functionality have traditionally been approached separately, Manhattan's Performance at Work initiative brings them together. This tightly integrated offering with a shared data platform allows goals to be measured in real time based on actual performance. And with increased access to critical performance data, the Performance at Work initiative improves employee engagement and increases supervisor effectiveness.



Slotting Optimization

It's about Location, Location, Location

In warehouses, like real estate, location makes all the difference. Product location directly affects productivity, worker safety and order accuracy. You want fast-moving items in the most accessible locations, heavy items placed to minimize damage, and total storage capacity optimized.

The challenges of smaller orders, SKU proliferation, volatile demand and shorter order-cycle times require non-stop optimization of warehouse space. As distribution operations adapt to requirements driven by omni-channel retail, slotting optimization becomes more critical to controlling costs and meeting customer expectations.

An Optimal Approach to Optimization

Because Slotting Optimization determines the best locations to slot your inventory, it increases workforce efficiency, shortens order fulfillment cycles and maximizes throughput. It also improves customer service by strategically grouping items together for fulfillment, and updating placement recommendations based on trends and new product demand.

As a 100 percent web-enabled application with an advanced math model that calculates optimal slotting, Slotting Optimization takes into account seasonality, sales trends and product variations, while maintaining preferred item sequencing and family groupings. Better yet, it is designed with the capabilities to handle even the most complex warehouses.

Features + Functions

- Easily set and re-set warehouse pick locations based on new product demand, changing consumer expectations and operational constraints
- Strategically group items for rapid fulfillment and update placement based on sales trends and product variations
- Use product characteristics and velocity to calculate a relative value for each potential placement
- Aggregate values for all products, and compare millions of move combinations against user-configured strategies
- Simulate different rule sets to find optimal configurations with scenario management capabilities

Right Inventory at the Best Place at the Optimal Time

Manhattan Slotting Optimization can increase picking efficiency, reduce replenishment requirements and maximize throughput by determining the best slot locations for all products in the DC. It's a powerful solution, with a proven track record even in the largest and most complex facilities.

Billing Management

A flexible, activity-based solution for 3PLs that uses time-based rules to streamline cost calculations and the invoicing process—dynamically managing the billing process across all facilities.

Features + Functions

- Implement activity-based billing to optimize profits
- Assign charges for warehouse processes including inventory storage
- Generate invoice reports for tenants or business units

Endnotes:

- 1 The Wall Street Journal, May 21, 2015
- 2 U.S. Dept. of Commerce
- 3 McKinsey
- 4 The Wall Street Journal, April 9, 2017
- 5 CBRE Group via the *Wall Street Journal*, April 9, 2017
- 6 The Houston Chronicle, April 17, 2017



Why Manhattan Active?

With more than 25 years of focus and investment, Manhattan is the recognized industry leader in Warehouse Management, delivering proven results at hundreds of customer locations around the globe. In fact, our Warehouse Management solution has been named as a leader nine times in a row in the Gartner Magic Quadrant for Warehouse Management Systems, and is positioned as highest in Ability to Execute as well as furthest in Completeness of Vision in the 2017 quadrant.

These accolades are the result of significant research and development (R&D) investment as well as great partnerships with our customers who are some of the most innovative logistics practitioners across an array of industries.

Active Distribution Solutions for Flexibility and Speed

The Manhattan Active Distribution suite allows enterprises to optimize large and complex operations, adapt to market and demand changes, and iterate and innovate at speed. By using our solutions, your distribution center will have technology that stays current, is seamlessly interconnected and runs anywhere. Mobile technology empowers supervisors and employees to work more efficiently and more productively.

In addition to Manhattan Active Distribution, our innovation in the supply chain and omni-channel arena has led to a broad suite of interconnected, market-leading solutions for transportation, distributed order management, supply chain planning and distribution center supplier enablement.

Ready to get Active? Manhattan Active™

Learn more at manh.com

