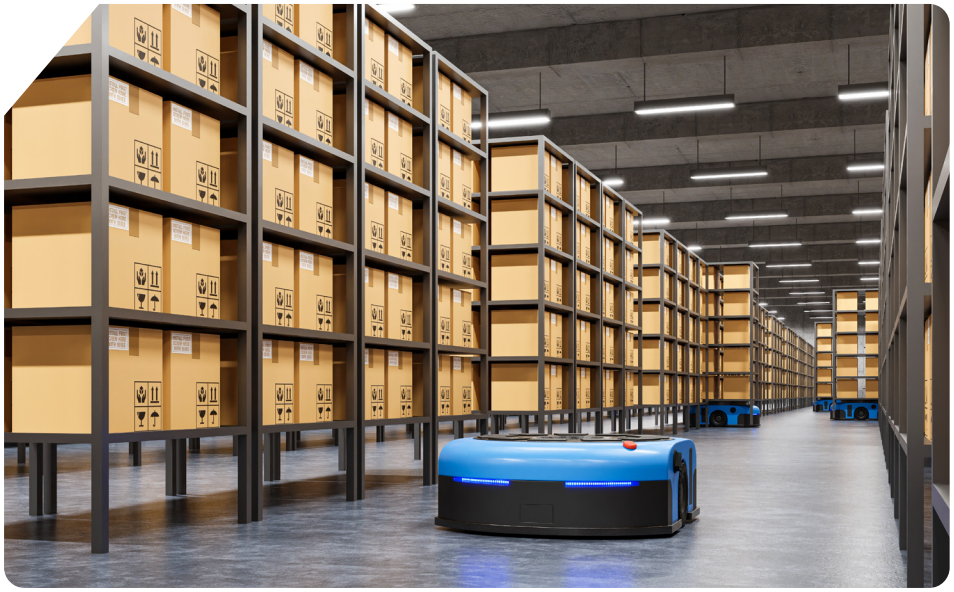
WHITE PAPER

WAREHOUSE EXECUTION SYSTEMS: WHY AN OPEN APPROACH TO DATA AND INTEGRATION MATTERS

INTRODUCTION

As the needs of warehouses, distribution centers (DCs), and parcel handling operations have grown more complex over the past decade, so too have the material handling systems that support them. To bolster efficiency as they fill or handle an exploding number of e-commerce orders and shipments, facilities have increasingly adopted automated material handling equipment.



Chief among these technologies are automated storage and retrieval systems (AS/RS), autonomous mobile robots (AMRs), sorters, conveyors, palletizers, light- and voice-directed picking technologies, and more. Historically, automated machinery like these systems functioned in a silo. That is, each solution operated with little connection to other hardware or equipment, warehouse management software (WMS), or labor.

With the demands many operations currently face — growing e-commerce and omni-channel fulfillment, customer expectations for fast deliveries and availability of diverse inventory, supply chain disruptions, staffing challenges, and economic uncertainty — it's become critical to achieve operational success by ensuring complete integration of all assets and resources. For that reason, companies are increasingly investing in a warehouse execution system (WES).

According to Gartner Supply Chain Research Vice President Dwight Klappich, "If all DCs were still just moving cases and pallets, we wouldn't be talking about WES."[1] He notes that a WES:

> ***...allocates and manages work for the warehouse environment considering multiple resources and constraints including labor, inventory, and the automation. For highly automated DCs, the need for a more sophisticated system that optimizes and prioritizes work is driven by the high velocity and volumes of order lines that e-commerce fulfillment operations must process each day."***

When evaluating and comparing potential WES softwares and vendors, however, it can be challenging to parse the differences. That's because the majority of WES solutions essentially do the same things:

- Merge warehouse control with tasks traditionally handled by a warehouse management system (WMS).
- Plan orders, intelligently release tasks, synchronize all current work, and continuously reprioritize workflows to optimize all processes.
- Support semi- or fully-automated DCs for fulfillment of high-velocity orders with specific delivery deadlines.

A key difference, however, often resides in the approach the architect of the WES takes with data and integration. This white paper examines the key advantages of WES software that does so.

RESEARCH FORECASTS WES ADOPTION GROWTH, PINPOINTS KEY CONCERNS

By synchronizing and orchestrating disparate assets, an overarching WES optimizes order fulfillment while enhancing throughput, accuracy, and productivity. Indeed, as more companies recognize these benefits — and invest in automation — investment in WES has correspondingly increased. This trend is expected to continue. Forecasts from The Business Research Company[2] anticipate the WES market to grow from $1.79 billion in 2023 to $2.02 billion in 2024. By 2028, the firm's analysts anticipate the WES market to expand to $3.42 billion.

Indeed, because WES software has not yet been widely adopted, these predictions may be conservative. Investigation conducted by Peerless Research Group on behalf of Modern Materials Handling found that just 19% of warehousing and distribution operations currently use a WES[3]. That means more companies will likely be evaluating potential WES software options and vendors over the next few years.

The same Peerless/Modern survey also asked respondents, "What challenges have you experienced, or would you anticipate, when adopting or implementing materials handling software applications?" The top answer, selected by 54% of those surveyed, was total cost of ownership. Other concerns surrounded overall value, integration, compatibility, and support. They included:

- Substantiating return on investment (ROI) – 39%
- Whether process efficiencies would improve – 35%
- Compatibility with existing systems – 30%
- Compatibility with host or legacy software – 24%
- Integration with existing software applications – 24%

Because a WES is the linchpin of a fully integrated operation, selecting the solution that offers the unrestricted access to key data and facilitates end-to-end system integration is crucial to achieving maximum benefit.

AN OPEN APPROACH TO DATA AND INTEGRATION MAXIMIZES A WES' VALUE

The point of deploying a WES is to synchronize and orchestrate a variety of different equipment, processes, workflows, and resources to optimize throughput. The more open the WES' architect chooses to be when designing the software, the less likely there are to be issues with compatibility and integration.

In turn, concerns about attaining the full value of the investment in a WES are unnecessary. By its very nature, a WES that takes an open approach to data and integration inherently presents fewer (if any!) obstacles to users seeking to improve overall efficiency by connecting and streamlining their operations.

If a WES that takes an open approach to data and integration provides better value, then why isn't every WES structured in the same way?

Certain WES software is created with proprietary, locked-down systems and data that is not accessible without special permission. That's because the primary goal of vendors selling proprietary WES solutions is to monetize the software as a product. Not providing open access to collected data and requiring custom programming to accomplish every integration ensures a continuous income stream for the developer.

A WES with an open approach to data facilitates performance analysis and optimization.

With the increasing deployment of automated solutions, the amount of data an operation can capture from equipment, sensors, and programmable logic controllers (PLCs) has grown exponentially. This includes information about productivity, performance, errors, faults, temperature shifts, vibrations, and much more. With forecasted investment in warehouse automation technologies expected expand at a compound annual growth rate of 15.91% to $71.03 billion in 2032[4], even more data will be available to operations managers in the near future.

A WES that takes an open approach to data facilitates the accessibility and utilization of this key operational information. Through data pipelines and application programming interfaces (APIs), such a WES communicates with other software to streamline transfer of collected data into an operation's data lakes or warehouses. In most cases no coding is required to implement these integrations. Instead, information is routed via utilization of standard, easy-to-read formats like JavaScript Object Notation (JSON), a data interchange format that is intuitive for users.

This open approach to data enables these types of WES to be compatible with a variety of commercial, off-the-shelf business intelligence (BI) tools. With these analytics packages — such as Microsoft's Power BI or Tableau — users can easily sort and filter any or all their raw data into dashboard visualizations and key performance indicators (KPIs).

In contrast, locked-down WES make it exceedingly difficult, if not impossible, to extract data from the system. In fact, some vendors claim that the collected information is their intellectual property. Others have concerns that allowing access to the data might slow the system down too much should a user run a query at an inopportune moment. The resulting lag in processing speed might disrupt operations. Still others have developed their own BI tools offered for purchase as an additional module or functionality. However, these tools rarely deliver the comprehensive range of analytical capabilities offered by the commercially available standalone BI solutions noted above.

A WES with an open approach to integrations is broadly compatible with a vast range of hardware and software.

An open approach expedites and simplifies a WES' ability to integrate and synchronize with all types of material handling equipment, controls, and software. That's because the core platform of the WES leverages a development architecture that is standards based and widely used by leading technology companies. That yields a WES that is scalable, flexible, and adaptable.

This adaptability enables a WES with an open integration approach to be highly compatible with different automated material handling systems, sensors, and controls from virtually every original equipment manufacturer. Likewise, via a secure API and integration bridge, it easily interfaces with software — including enterprise resource planning (ERP) systems and warehouse management software (WMS) from major suppliers, as well as homegrown and legacy systems.

Should an integration or compatibility issue arise, finding a resolution can be as simple as a Google search. Because such a large community of developers exists across the many industries using and refining the WES' base platform, there is almost always a fix or workaround available that can be quickly and cost-effectively deployed.

Conversely, proprietary, locked-down WES are more difficult to integrate, as they often require custom code development to connect to hardware and software. Because only the programmers involved in the WES' development can easily modify, troubleshoot, and enhance the code, the WES vendor charge users a premium for every integration.

Likewise, when locked down WES software requires an update — or worse, an emergency fix — an operation can experience significant downtime while the support team tries to understand the code. While this represents job security for a proprietary WES' development team, it can make it considerably more difficult for users to get the support they need if those staffers move on to other companies.

DATUM powered by dcs

CONCLUSION: MEET DATUM – A WES DESIGNED TO DELIVER MAXIMUM VALUE

Built from the ground up with modern platforms used by leading technology companies, DCS created DATUM WES to be able to integrate with any equipment from any original equipment manufacturer (OEM). Not available as a standalone product, DATUM delivers even greater value for customers who partner with DCS for integrated system deployments. Implementing DATUM is often the first step in helping an operation advance on its roadmap toward higher levels of automation and system intelligence.

Its open approach to data and integration sets DATUM apart from other WES software in the market. Highlights include:

- A flexible, secure API gateway and integration bridge for easy integration with nearly every existing software system, including those from major suppliers, legacy systems, and homegrown applications

- Support of modular hardware configurability to remove silos of automation by integrating with a virtually unlimited range of material handling hardware and warehouse automation — such as AS/RS, conveyors, sorters, robotic fleets, parcel finishing equipment, palletizers, mobile devices, light- and voice-directed picking, and much more.

- Robust, stable, and secure base architecture that maximizes reliability and overall value.
- Customizable deployment options, including on-premise, in the Cloud, or a hybrid configuration.
- Sophisticated, dynamic, and intelligent container management that streamlines and manages inventory handling and order flow throughout a fulfillment operation.
- Intuitive, web-based user interface with built-in and customizable dashboard analytics, dynamic keyword searches, and internal data sharing for collaboration across workflows, departments, and processes.

Is DATUM right for your automated operation?

Connect with one of DCS' software experts to discuss your unique needs, as well as access a virtual demo of DATUM.

ABOUT DCS

Headquartered in Franklin, Tenn., Designed Conveyor Systems (DCS) has 40 years of experience serving major clients in multiple industries by providing material handling, full-scale warehouse operations, and conveyor design solutions that are custom crafted for their needs. DCS does not sell ready-made conveyor systems but builds relationships that empower collaboration to craft custom warehouse designs together. DCS utilizes consulting, engineering design, project management, installation services, and client support to ensure our customers can keep their promises to deliver on time.

ENDNOTES

1 "Warehouse Execution Systems for Distribution Center & Warehouse Automation." Modern Materials Handling, 26 Mar. 2021, www.mmh.com/article/wes_its_for_warehouse_automation_and_more.

2 Warehouse Execution System Market Opportunities, Share Analysis, Forecast 2033, The Business Research Company, 1 Jan. 2024, www.thebusinessresearchcompany.com/report/warehouse-execution-system-global-market-report.

3 Forger, Gary. "Software Usage Survey: Spotlight on Technology." Modern Materials Handling, 11 July 2023, www.mmh.com/article/software_usage_survey_spotlight_on_technology.

4 Warehouse Automation Market Size to Hit USD 71.03 Bn by 2032, Precedence Research, 1 June 2023, www.precedenceresearch.com/warehouse-automation-market.

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