WAREHOUSE EXECUTION SOFTWARE

UNDERSTANDING EXECUTION SOFTWARE AND MAKING THE RIGHT SELECTION.

White paper written by
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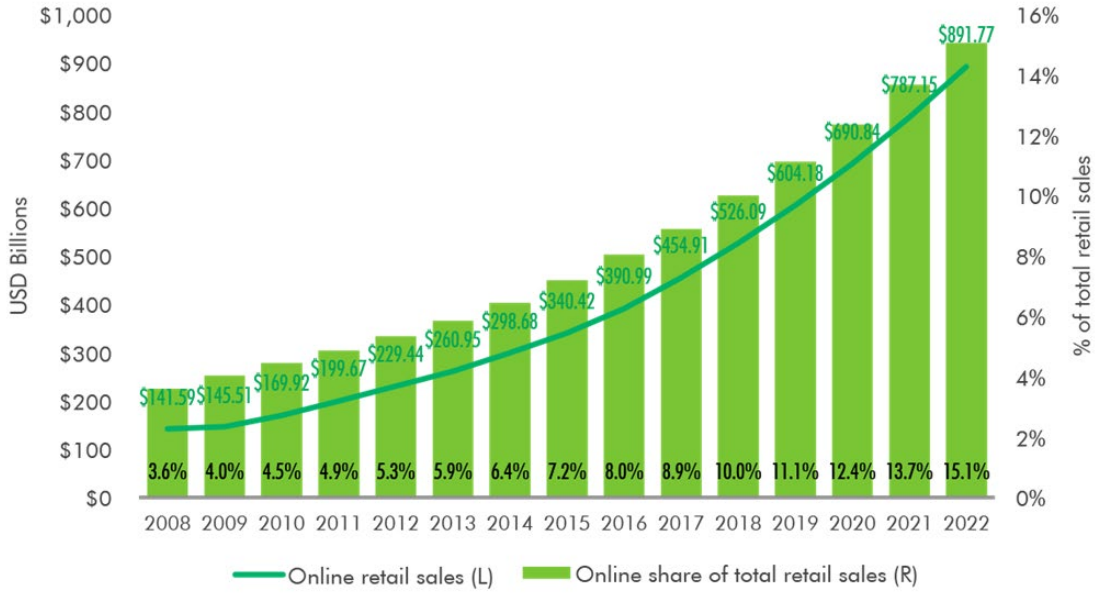
WAREHOUSE EXEUCTION SOFTWARE (WES)

Over the past few years, one of the most widely discussed software topics in warehousing has been the Warehouse Execution System (WES). Despite the substantial amount of attention this topic has received, the confusion with which system will obtain the most significant benefits remains quite high. This confusion originates in the history of WES and extends to the current day environment where each software provider offers their version of a WES.

BEFORE THERE WAS WES

For many years, automated warehousing software systems could primarily be classified into two well-known and market accepted categories; Warehouse Management System (WMS) and Warehouse Controls System (WCS). With the WMS having the responsibility for knowing what inventory is within the building, where it's located, and effectively allocating the inventory to fulfill orders and move product out the door. The WCS has the responsibility for communicating with downstream automated MHE and converting the WMS directed transactions into PLC-driven product movement. In other words, WMS responsibilities typically lie within the administrative tasks that need to be completed while the WCS focuses on equipment control and product movement.

The combination of these two systems effectively satisfied the needs for most warehouse and distribution center operations for many years as the typical retail fulfillment model stayed mostly unchanged for decades. However, due mainly to the rise of e-commerce, many companies found their traditional systems no longer gave them the flexibility that direct-to-consumer order fulfillment required.



E-commerce as % Total Retail. Source eMarketer 2018

Alongside the more traditional and largely predictable demands of fulfilling retail operations, came the sudden need to address significantly smaller sized orders in exceedingly larger order quantities. The operational processes used for retail order fulfillment were no longer appropriate nor easily applied to e-commerce fulfillment.

The existing software systems built around these traditional retail processes also began to demonstrate their inherent flaws. At the core of these issues is the question of how to effectively fulfill customer direct orders both within the expected timeframe desired and at the productivity level needed. At a minimum, a software system needs to do the following:

- Quickly access inventory quantities & locations within the warehouse
- Dynamically manage a continuously updating customer order pool
- Release the right amount of work at the right time to operations
- Deploy picking strategies that are flexible to changes in order profiles

The items above are not an exhaustive list of expected capabilities, but at their core, they provide warehouse operations that are desperately needed within an e-commerce environment - flexibility and optimization.

FILLING THE SOFTWARE VOID

WMS's had the knowledge of inventory and business processes within the warehouse while also maintaining upstream interfaces to the customer's ERP system to collect order information. However, it did not have real-time direct access and monitoring of downstream automated MHE activity and capacity.

The alternative to this, WCS maintained interaction with lower-level PLC programming to know the status of the orders within the warehouse and the equipment being used to move it. However, WCS lacked a cohesive view of the overall broader picture. It may have had detailed knowledge of the conveyor capacity within a pick zone, the number of put walls that currently have open cubby capacity, or control the logical decisions made at each sortation point throughout the warehouse. Unfortunately, WCS does not have the ability to optimize the use of the MHE resources it interacts with through better workflow planning and prioritization.

The dynamic between these two systems, within a backdrop of a changing warehouse operations environment, allowed for the upstart of a new class of execution software. To effectively distinguish this new software from existing players within the field, a new moniker was introduced to the marketplace called WES, or Warehouse Execution System software. This software promised to seamlessly lie between existing WMS and potentially WCS systems within automated warehouses to fulfill the void that existed. At the core of the WES in the most simplistic description, is software that provides warehouses with the ability to optimize their order execution activity.

At a minimum, the value proposition for WES resides in its ability to bridge the gaps between WMS and WCS. Also, with the ability to provide potentially overlapping functionality that extends both upstream into WMS and downstream into WCS. This gives warehousing operations flexibility to decide which functionality is provided by which software system—allowing for the selection of the system that is most apt to provide the best solution for a specific feature or functionality.

SO, WHAT IS WES?

Depending on whom you pose this question too, the answer you receive may vary dramatically. Since WES software typically lives within the area that lies between WMS and WCS functionality, what is or is not included within a typical WES is often determined by those who are providing the functionality.

There are no hard boundaries around specific functionality that are always included. As a result, what one WES provider is capable of offering may differ significantly from another provider. Additionally, two providers may offer the same functionality, but how successful the integration of the functionality is into the operations may dramatically vary between providers. Each system provider will have particular strengths in functional areas that they are able to leverage.

There are, however, generally accepted areas of functionality that the market typically expects to be provided as a core WES solution. Depending on where the provider lies on the spectrum of warehouse software, one might also see both WCS and WMS functionality folded into a WES solution. The chart below shows "typical" features offered in each system.

WCS Warehouse Controls Software	WES Warehouse Execution Software	WMS Warehouse Mgmt. Software
• Scanner Integration • Conveyor Routing • Transaction Logs • Software based Sortation • Integrated Camera System • HMI's • Statistics Dashboards • PTL Technologies • Order Consolidation • Print & Apply	• Picking Technologies • Location Management • Productivity Reports • Order Throughput Visibility • Order Release Optimization • Order Pool Management • Batching Optimization • Labor Mgmt. Optimization • Cubing & Cartonization	• Inventory Mgmt. • Bin Location Mgmt. • SKU quantities • Receiving & Put away • Replenishment • Order Picking • Consolidation • Pack-out functions • Value Added Services • Returns Processing • Slotting

It should be emphasized that this is not an exhaustive list of functionalities, as the lines are continuously blurred between the three systems. Understanding specific functionality within a software solution is more important than merely selecting a WES over a WCS. Software providers have added features that transcend specific software silos and, as a result, users have more flexibility in the system they choose.

As interest in WES solutions increase, the market has responded. A quick search will provide dozens of providers that are currently marketing WES solutions. Some of these are new software providers, while many are long-standing proven providers that are actively building out new features to compete in the WES landscape. To provide context, the current market of WES providers can be broadly separated into three categories. Below is a brief description of each of these:

WCS Based – System providers whose core competencies lie within their history of providing PLC controls and the software layers that interface to these controls. These providers are moving upstream to offer core WES functionality by leveraging their ability to successfully communicate in real-time with automated material handling equipment. Having this communication allows for an understanding of downstream resource utilization that provides the proper amount of work to be released down to the operations.

WMS Based – System providers whose background and expertise lie within their ability to provide inventory control systems. These providers are moving downstream to help fill the execution software void with a core understanding of how orders will flow into the warehouse, the inventory required to fulfill them, and an optimized approach to picking.

WES Based – System providers who have come to market specifically to address the void in execution software. The product offering from these companies has been tailored to fit a specific gap in functionality that originated between a typical WMS-WCS structure.

It is easy to assume a provider falling into the last category (WES Based) automatically offers an advantage above the others. While these providers may have help mold what the market has come to expect in a base WES solution, the competitiveness on a functional level from downstream WCS and upstream WMS software has significantly increased.

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SELECTING THE RIGHT EXECUTION SOFTWARE

Understanding the functionality required operationally, coupled with a comprehensive view of features and functionality offered by specific providers, is at the core of making the correct software system selection. It is crucial to be able to distinguish between those providers who have added true execution software capabilities and those who have rebranded legacy products to fit within a solutions space that is gathering a lot of attention. It cannot be overemphasized that WES providers will have different strengths as you compare those providers across various software functionality.

Existing warehouse systems already in place, or already selected for a new facility, could also have a significant impact on a provider selection. For companies with a home-grown WMS, their focus might be towards providers within a WMS based background. This could allow for a hybrid WES solution that pulls in otherwise typical WMS functionality as part of a broader-based WES solution. Thus, giving the end-user the ability to bolt on additional software features to enhance their existing WMS already installed.

For companies positioned with a well-established WMS who are actively looking to add automation to their facilities, WES providers with a background in PLC controls and equipment automation may offer them the best solution. In this scenario, combining WES functionality with proven WCS features that provides real-time insight into the automation MHE may be the best option.

Selecting execution software also does not have to be viewed as an all or nothing approach. Most providers today should be willing to take a phased approach to software implementation where it makes sense. This gives the end-user quite a bit of flexibility on risk mitigation. Operationally, essential functionality can be brought on immediately as apart of an initial system go live with additional optimization add-ons delivered at a later time. With this approach, understanding the full suite of capabilities offered by the WES provider is still necessary to ensure future alignment with the user's needs and new potential functionality required.

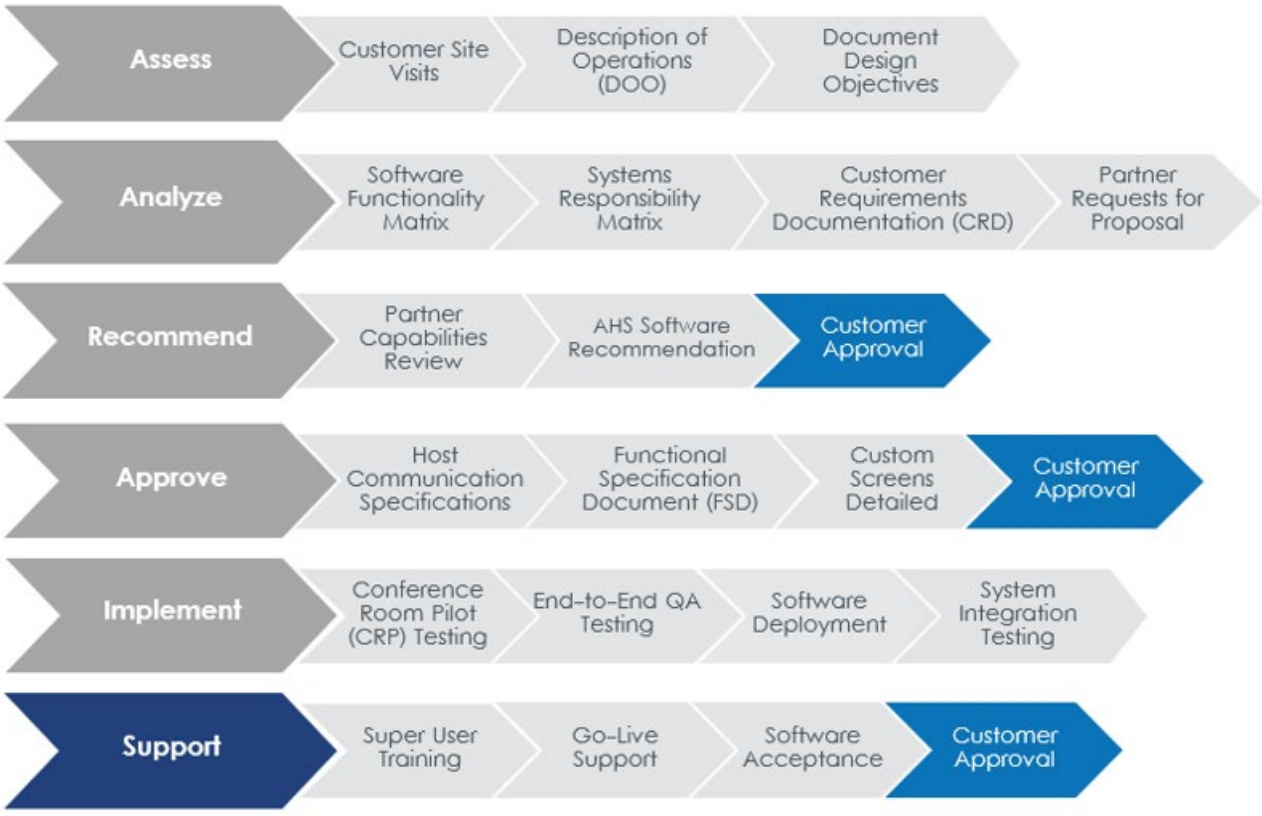
While the focus here has been around functionality, it certainly should be stated that this is not the only consideration in the selection process. While the features offered often lead the discussion, some additional items to consider are listed below.

- Ongoing customer support provided
- Total costs of ownership
- Industry-specific experience
- Ability to demo software
- Scalability of the software
- Base vs. customer offerings

HY-TEK INTRALOGISTICS' APPROACH TO SOFTWARE

With the functional boundaries of each software system getting increasingly blurred, having a basic understanding of the solutions available in the marketplace is critical.

Hy-Tek has the ability to provide software systems that are designed to fit the unique needs of every client. Focusing on client-specific needs, we can provide software functionality to ensure that the appropriate solution has been designed, developed, and fully implemented. To accomplish this, our team leverages the DesignBuild process throughout the entire software process.



Hy-Tek DesignBuild Process

" ...focus on what the functionality offered fulfills. The requirement will yield a far better result."

Hy-Tek Intralogistics is in the unique position to remain agnostic to the software system provider for our clients. While we have the ability to provide fully featured WES systems to end-users, we do not have an obligation to provide specific software platforms. The Assess, Analyze, and Recommend phase of our DesignBuild process is about developing a thorough understanding of the operational requirements to build out the appropriate software system solution.

The Approve, Implement, and Support phases are about ensuring a successful implementation from start to finish once a software platform has been selected. As a part of this, the design solution must be fully documented and detailed out for our client's approval. Testing in various stages is critical to ensuring a successful project go-live, from conference room pilot test, end-to-end Q&A testing, and ending with full system integration testing.

CONCLUSION

The advantage of recent trends in the WES landscape means that customers today now have more options than ever when assessing how to fulfill their execution software needs within the warehouse. The trade-off being with increased options, there's more confusion around which system is the best fit for a specific need. Instead of focusing on the old debate between WCS vs. WES vs. WMS, focus on what the functionality offered fulfills. The output will yield a far better result.