FIND YOURS.

WMS, WES, WCS – Which Warehouse System Has the Ball?

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Session Objectives

• Define WMS, WES, and WCS system boundaries
• Discuss best practices for deployment

• Examples:
  • “Identify the symptoms and root causes of sub-optimal processes”
  • “Use the xyz checklist for implementing and evaluating a new process”
  • “Determine readiness for automating your new process”
Session Objectives

• Define WMS, WES, and WCS

• Identify boundaries between these systems

• Determine which systems have the best “line of sight” into various distribution concepts
WMS, WES, WCS – Which System Has the Ball?
Automation is Growing

• Tight labor markets

• Need for more capacity

• Fulfillment as a competitive weapon
Automation is Growing in Variety and Sophistication

Traditional MHE

Sophisticated Storage and Retrieval

Cutting Edge Robotics
WMS, WES, WCS - Definitions

• WMS – Warehouse Management System

• WES – Warehouse Execution System

• WCS – Warehouse Control System
WMS – A bit Deeper

Core Features
• Pre-Receiving
• Receiving
• Putaway
• Inventory Management
• Replenishment
• Wave Management
• Omni Channel Fulfillment
• Picking/Packing
• Shipping

Advanced Features
• Yard Management
• Appointment Scheduling
• “Waveless” Picking
• Mobile Execution
• Labor Management

Next-Gen Features
• Artificial/Cognitive Intelligence
• Machine Learning
• Virtual/Augmented Reality
Core Features
• Automation Connectivity
• Order Reprioritization
• “Real Time” Pick Optimization

Advanced Features
• Congestion Avoidance
• Orchestration across multiple WCS

Next-Gen Features
• Replenishment
• Holistic Inventory Management
• Orchestration across man and machine
WCS – A bit Deeper

Core Features
- Real-time Movement
- Material Routing
- Conveyor Buffering
- PLC level control
- Divert
- Sort

Advanced Features
- Congestion Avoidance
- Workload Balancing

There are often multiple WCS in a DC
What are the Analysts Saying?

“To address their needs for fast-paced and agile fulfillment, warehouse leaders are being forced to invest in new processes and technologies for managing orders.”

“Initially, WCS vendors will innovate and continue to add business logic… In parallel, some thought-leading WMS vendors will (...) build their WMSs to reach further into the automation layer.”

Dwight Klappich, Gartner
Gartner Hype Cycle for SCE Technologies
July 2016

“…the use of warehouse automation is going to increase in the future. This is making the ability to coordinate and communicate with automation increasingly important. As a result, WMS vendors are making strides into the control system layer to extend their value proposition…”

Clint Reiser, ARC
Warehouse Automation Global Market Update
June 2018
### WMS, WES, WCS - Visibility

Key "Natural Resources" in the Distribution Center

<table>
<thead>
<tr>
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<th>WMS</th>
<th>WCS</th>
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<td>Orders</td>
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<td>Inventory</td>
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Along Came the WES

Warehouse Management (WMS)
- Pick to Light
- Put to Light
- MHE Diverts

Warehouse Control (WCS)
- Item Status
- Weigh oLPN
- Container Status
- MHE Diverts
- Flow Paths

Orders/Order Status
- Inventory
- Task Plan

Warehouse Execution

Cumbersome
Redundant
Expensive!!!
Is there a Better Way?

Warehouse Management

wMS

wES

Warehouse Execution

Pick to Light
Put to Light
MHE Diverts

Status
Key Metrics
Visibility

Item Status
Weigh oLPN
Container Status

Warehouse Control

wCS

v

Warehouse Control

wCS

FIND YOUR WOW
Key Takeaways

• All 3 systems can play a role in today’s DC

• More systems are not always required, especially if the WMS has native WES capabilities built in

• Let each system do what it does best
  • **WMS** for planning, fulfillment optimization, and inventory management
  • **WCS** for physical movement of goods
  • **WES** when a WMS/WES combination is not available
For More Information

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