The Smart Warehouse of the Future - Here Today

Presented by:
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Dinesh Dongre
Today’s Speakers

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Chief Marketing Officer
Softeon

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VP of Strategy
Softeon
Softeon Supply Chain Suite

SOA Platform Architecture

Configurable
Implement precise functionality with flexible configuration. Single Unified Platform

Rules-based
Adapt to dynamic business environment with flexible user-defined business rules

Incremental Implementation
Implement solutions as needed. Add new capabilities seamlessly.

Easy On-boarding
Collaborate with vendors and onboard customers faster with web-based and Cloud based solutions
<table>
<thead>
<tr>
<th>Example Customers</th>
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</thead>
<tbody>
<tr>
<td><strong>Omnichannel + Retail</strong></td>
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<tr>
<td>ALEX AND ANI</td>
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<td>BROOKS</td>
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<tr>
<td>FEDERATION LOGISTICS LLC</td>
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<tr>
<td>CEVA LOGISTICS</td>
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<td>RANSA</td>
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<td>DENSO</td>
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<td><strong>3PL</strong></td>
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<td>DB SCHENKER</td>
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<td>UPS</td>
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<td>Saddle Creek LOGISTICS SERVICES</td>
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<td>Reliable</td>
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<td><strong>Manufacturing</strong></td>
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<td>Suncast</td>
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<td><strong>Food + Beverage</strong></td>
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<td>Integrated Distribution Services</td>
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<td>HENSLEY Beverage Company</td>
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<td><strong>Entertainment + Technology</strong></td>
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<td>PETER MILLAR</td>
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<td>HONEST</td>
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<td>TOUCHSTONE CRYSTAL BY SWAROVSKI</td>
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<td>BANNEKER</td>
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<td>OIA GLOBAL</td>
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<td><strong>Direct Selling, Consulting + Marketing</strong></td>
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<td>SAMSUNG</td>
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<td><strong>Pharma</strong></td>
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<td><strong>MORE</strong></td>
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# Warehouse Operational Challenges

<table>
<thead>
<tr>
<th>Category</th>
<th>Done Smartly</th>
<th>Done Less Smartly</th>
</tr>
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<tbody>
<tr>
<td>Order Processing &amp; Management</td>
<td>Streamlined prioritization of orders, less touches, order cycle times to meet cut offs, less short-picks. Visibility throughout execution.</td>
<td>Inefficient picking and consolidation, Cut-off missed, less shipping options, additional box shipped, sub-optimal shipping to stores</td>
</tr>
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<td>Inventory &amp; Layout Management</td>
<td>Velocity based slotting, optimized travel routes, high pick density, low short picks, smaller exception operations</td>
<td>Wave tails, chase task operations, multiple location complexities</td>
</tr>
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<td>Capacity Management</td>
<td>Optimal utilization of automation system, higher throughput. Seamlessly add new technology (subsystems)</td>
<td>Poor pick rates, extended dwell times, set asides, under utilization of MH equipment, re-circ/idle-time of equipment, congestion etc.</td>
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<td>Resource Management</td>
<td>Labor assignments based on real-time data, including IoT, work-load based labor balance, hence less labor needed</td>
<td>Labor under utilized, assignment and workload mis-alignment. SLAs missed</td>
</tr>
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<td>Decision Making</td>
<td>Real-time data available for decision. More Decentralized decisions and automate decision making as much as possible</td>
<td>No visibility into events and progress. Batch processing and most decisions are manual and need for more supervisory time</td>
</tr>
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Current Scenario

• WMS’s are Very Good...

• ...but with a Limited Amount of Smarts
Current Scenario (Con’t)

• Overlapping Options

WMS  WES  WCS

Artificial Intelligence and Machine Learning
How Did We Get There?

<table>
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<tr>
<th>WMS</th>
<th>WCS</th>
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Decision-Making  Automation Execution
### Some Implementations

<table>
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<th>WMS</th>
<th>WCS</th>
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**Why?**
- Lack of WMS Capabilities
- MHA Vendor in Control of Customer
- Agreements between WMS and WCS Vendor
New Dynamic – Rise of WES

Why?
- WES Developed Due to Perceived Shortcomings in WMS
- Lack of Attention to MHE Utilization
- True for Some, not for All
## Gartner’s View

<table>
<thead>
<tr>
<th>System</th>
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<td>Warehouse control system (WCS)</td>
<td>Middleware that sits between the WMS and the PLCs that control material handling automation devices. The WCS translates business-transactional information coming out of a WMS into real-time instructions for the automation. WCSs also help orchestrate product movements within automated warehouses.</td>
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<td>Warehouse execution system (WES)</td>
<td>An emerging hybrid that blends capabilities from both a traditional WMS and a WCS. A WES builds on the WCS’s near-real-time insight into what’s happening in the automated warehouse, but it adds business process logic to this layer.</td>
</tr>
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<td>Warehouse management system (WMS)</td>
<td>The traditional business applications that handle business transactions, such as receiving goods, putting them away, and picking, packing and shipping orders. The focus of a WMS is on inventory and transactional integrity for people-managed processes. On top of process integrity, WMSs have been enhanced to support more and more capabilities that are intended to proactively drive process and productivity improvements.</td>
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<td>Warehouse execution system (WES)</td>
<td>An extension to the traditional WMS that provides advanced execution capabilities, such as tracking and control of equipment usage, to help improve and streamline fulfillment processes.</td>
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<td>Warehouse management system (WMS)</td>
<td>The traditional WMS that is used to plan and control all aspects of the fulfillment process is further enhanced to support more advanced capabilities that focus on improving process efficiency and scalability.</td>
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A Gartner client once summed it up when they said that “warehouse people take extreme pride in being good expeditors.” Said another way, they get the job done and solve problems as they occur. Another customer argued that, because of the environment warehousing lives in, you “can’t plan,” you must design, to hopefully, intelligently react. This is no longer good enough...The smart warehouse is the future platform that addresses the new reality.

Dwight Klappich
Gartner
Softeon’s WES Definition

• Extension of WMS but Can be Deployed Standalone

• Provides New Levels of Visibility, Control, Orchestration and Optimization of Order Picking and Related Process, including Optimization of Materials Handling Systems Flows, Beyond what is Available Today even in Advanced Warehouse Management Systems

• Works for Automated, non-Automated and Hybrid DCs

• One System to Manage All Automation in the DC

• Provides the Path to Deliver the Game Changing “Autonomous WMS”
UPS Building Smart Warehouse of the Future on Softeon WMS/WES

UPS rolls out new WES offering

Company officials said that this new WES, which was developed by UPS and Softeon, a provider of supply chain technology services, is geared towards enabling faster intake and fulfillment for customers, notably those with fluctuating order patterns, are able to get products on time.

By Jeff Berman, Group News Editor - April 24, 2020

Atlanta-based global transportation and logistics bellwether UPS said this week its UPS Supply Chain Solutions group has rolled out a new Warehouse Execution System (WES) offering, entitled Smart Warehouse Technology, with a focus on augmenting distribution center efficiency.

Company officials said that this new WES, which was
WES is the Platform to optimize work and resources

Automated Decision Making

Orders  Inventory  People  Work  Machine

Softeon WES
(Single Execution Platform that can seamlessly integrate with any control system)

WES enables:

- Granular Visibility to Processes/Work Areas
- Orchestration and Optimization
- Automated Flow of Work Based on Priorities, Capacities, Work Load and more
- “Waveless” Processing

WCS (Vendor A)
WCS (Vendor B)
Shared Component Library for WMS and WES

• Advanced Cartonization
• Optimized Order Planning and Release Based on Many Variables, Including Priority, Travel Path and Distance, Bath and Clustering Opportunities, Replenishment Status, and More
• Waveless, Wave-Based, or Hybrid Picking
• Configurable Order Pool Management
• Dynamic Slotting
• Direct Management and Control of Picking Subsystems Including Voice, Pick-to-Light, Smart Carts, Put Walls, Conveyors and Mobile Robots
• Dynamic Pick Cart and Put Wall Order Assembly
• Hot Order Insertion
• Packing Operations

• Parcel Shipping
• Print-and-Apply
• Distribution Center Resource Planning Based on Simulation of Actual and Forecast Order Volumes
• Real-Time Monitoring of Activity and Throughput by Individual Processing Area in the DC
• Analytics on Available Versus Required Resources (People and Equipment) by Processing Area
• Auto Assignment of Resources to Processing Areas
• Pull-based Order Release Based on Outbound Shipping Schedules, Service Commitment, and Carrier Cut-Off Times
• Labor Management and Reporting
Granular Real Time Visibility

- **Open Orders**: 8 / 33
- **Orders With Issues**: 8 / 33
- **Containers Waiting for Repln**: 25 / 29
- **SPS - containers ready for cart build**: 388 / 431
- **LTL - containers ready for cart build**: 3 / 7
- **Open carts in the queue**: 12 / 12
- **Carts in picking status**: 13 / 13
- **Pending Case Pick Lines**: 233 / 370
- **Today’s Shipment - Orders to Pick**: 565
- **SPS - Containers yet to be packed**: 131 / 131
- **Today’s Shipped(Orders/Lines/Qty)**: 471 / 762 / 8763
- **Today’s Shipped Units(SPS/LTL)**: 3613 / 5150
- **Replenishment Feasibility**: 24 / 80
- **Alerts**: 0

*Softeon Confidential*
Powerful Dashboards
Demand v/s Capacity Dashboard from Simulation

Case Pick – Demand Vs Capacity

Time Slot

Demand vs Capacity
Dynamic Capacity Management through Simulation
Automated and Real-Time Decision-Making

WES is “Always on” to make Decisions

What orders to release to the floor next?
How many orders to release to the floor based on capacity?
How best to consolidate the picks?
When to pick the inventory for any given order?

Which inventory to use for optimal processing?
What combination of qty is most optimal?
Which automaton can move the inventory?
What locations to replenish and when based on status?

Which people resources to assign for optimal execution?
How many resources to assign to every work area?
How to balance people resources based on demand?
How do the people resource travel from point A to B?

What equipment to use based on demand?
What is the current capacity and what can be planned?
How to avoid congestion?
Automated Order/Work Release

- **Dynamic Rules-based Auto Release of Order/Tasks**
  - Order Attributes (Priority, Ship Date, Customer, and More)
  - Resource Capacity and Standards
    - Labor & Resource Type (Case Pickers, etc.)
    - Equipment (Cart, Robots, etc.)
    - MHE (Putwall, Conveyor, Sorter, Diverts, etc.)
  - Reprioritization
  - Workload Balancing
  - Real-time feedback (changes in priority and/or ship times, inventory, capacity)

- **Identifying best channels of work (Pallet Pick, Putwall, Case Pick, etc.)**
  - For example - Ability to accumulate full case picks into pallet picks based on configurable amount of time for newer orders

- **Configurable, Dynamic Rules**
Dynamic, “Aware” Pick Release Management

Condition and Event Monitor

Process Channels

Sample criteria
- (Pick/Replen) Zone balancing
- Channel based priority
- Continuous Wave
- Carrier/Service Level based
- Capacity based (Resources)

ERP
Ecommerce (Web)
Customer Service

Orders

Dynamic Order Orchestration & Optimization

Pallet Pick
Case Pick
Each Pick
PTL
Odd Size Pick
Cluster Pick
Pick to Belt
Case Replenishment
Pallet Replenishment

Putwall
Shipping
Parcel
LTL
Parcel
LTL/TL

Shipping Prep
Parcel
Packaging

Packing/Pack Stations

Shipping

P&D

LT/LT

LTL
Example Optimization of Order Batching – Cart Picking

• Cartonization to Drive Picking Efficiency
• Cluster Building based on relative proximity between picking locations of containers
• Parameter driven batching/cluster-building based on
  ▪ Cart size
  ▪ Number of free carts
  ▪ Wait times
  ▪ Resource availability
• Strike the right balance between optimization of cart build and on-time task completion (Static Cart Vs Dynamic / Perpetual Cart)
• Intelligent Hot Order Insertion
Simple Example Pick Release Scheduling

The Scenario

• Put Wall Subsystem
• Order with 3 Lines
  ▪ 2 from Carton Flow Rack
  ▪ 1 from Mezzanine
• Mezzanine Picks Take 25% Longer to Pick and Transport

The Solution

• WES Releases Mezzanine Picks in Effect 25% Earlier than Carton Flow Rack Picks
• Picks from Both Areas Arrive to Put Wall about the Same Time
• Machine Learning to Improve Estimates Over Time
Real-Time Constraint Based Fulfillment

WES can efficiently orchestrate based on available capacity

- **Cluster Cart Picking**
- **Packing**
- **Order Cons.**

**Work Flow 1**

- **ASRS**
- **Unit Sorter**
- **Pack Out**

**Work Flow 2**

- **ASRS**
- **Pick From Reserve**
- **Putwall**

**Work Flow 3**

- **ASRS**
- **Unit Sorter**
- **Pack Out**

Constraint Points
Traditional Order Fulfillment

Peaks and valleys in Labor and Equipment Utilization

![Graph showing % Utilization of Picking, Sorter, and Packing over Time]
Automated Order Fulfillment

More Consistent Labor and Equipment Utilization

Utilization %

Time

- Picking
- Sorter
- Packing

MODEx
Smart WMS Users will also Interact with the System Using Voice

“I need a replenishment for Location CD05N2.”

“Where are we on the last wave?”
Delivering Real Results

Potential Gains from Implementing WES

- **FTE Reduction**: 12 – 20%
- **Order Cycle Time**: 25 – 30%
- **Utilization**: 15 – 20%
- **Throughput**: 10 – 15%
- **Hardware investment**: 20 – 30%

**100% Productivity Gain at One Major 3PL**
Smart WMS Components

• Leverage of IoT
  ▪ Analytics
  ▪ Task Assignment (Proximity)
  ▪ Robot-Human Validation
  ▪ Social Distancing App
Summing It Up

• We have Entered a New Era for Smart Warehouse Software
  ▪ WMS + WES
  ▪ Optimization
  ▪ Dynamic Orchestration
  ▪ Capacity and Constraint Aware
  ▪ Automated Release of Work Based on Many Variables
  ▪ “Always On” Processing

• Not a Vision
  ▪ These Capabilities are Available Today

• Pull-based “Flow Distribution”
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Or visit MODEX Booth #C7466