Taking WMS to the Next Level of DC Process Automation

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Current WMS Landscape

➢ Interest /Adoption in WMS Remains High
  ▪ Omnichannel, Changing Order Profiles, Aging Installed Solutions

➢ Yet, Many WMS Providers Have Scaled Back WMS Development
  ▪ Think All the WMS Problems have been Solved, Focusing in Other Areas

➢ WMS is Rich in Development Opportunities that will Create Next Generation Solutions and New Levels of Productivity and Performance
  ▪ Many Next Gen WMS Capabilities Here Today
Next Generation WMS Capabilities

- Flexible Deployment Options (On-Premise/Cloud/Hybrid)
- Technology Platforms Based on Service Oriented Architecture
- Implementation Templates and Wizards
- Advanced Material Handling System Integration
- Direct WMS Control of Picking Subsystems
- Distribution Process Optimization
- WMS Simulation
- Expanded Voice-Enablement
- Futures
WMS Move to the Cloud

➢ Despite Late Start, WMS Moving Rapidly to the Cloud

➢ Gartner: “By 2020, over 90% of Spending on Supply Chain Execution Systems will be for Cloud-based Solutions”

➢ Underlying Architecture Key to Flexibility
  ▪ Cloud, on Premise, Hybrid
  ▪ Smart Mobile, Optimized RF Communications
WMS Move to the Cloud

Company Distribution Network – One WMS Solution

- Large DC On-Premise
- Large DC On-Premise
- Mid-Size DC On-Premise
- Mid-Size DC Cloud
- Small DC Cloud
- Small DC Cloud
- Remote DC Hybrid
WMS Move to the Cloud

➢ Move from On-Premise to Cloud with No Data Migration

➢ Single WMS Instance for Large and Smaller Facilities
WMS Move to the Cloud

➢ Support for Hybrid Deployment
WMS Agility through SOA/Componentry

➢ Flexibility at Multiple Levels

SOA Platform

- WMS
- TMS
- LMS
- Slotting
- DOM
- YMS
- VMI
WMS Agility through SOA/Componentry

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WMS Agility through SOA/Componentry

➢ Flexibility at Multiple Levels – Adding Modules

SOA Platform
WMS Agility through SOA/Componenetry

➢ Flexibility at Multiple Levels – Adding Capability Components
WMS Agility through SOA/Componentry

➢ Flexibility at Multiple Levels – Adding Capabilities

SOA Platform
Use of Templates and Wizards Transform WMS Deployment

- WMS and Risky
- Many WMS Providers have Tried Templates, Never Worked Out Well
- How to Solve the Problem
- Not only Reduce Effort/Costs, Prevent Mistakes
Significant Advances in WMS/MHA Integration

➢ New Levels of Materials Handling Automation Integration
  ▪ Release Work to Match Downstream Utilization
  ▪ Master Waves/Release Waves

➢ New Approaches to Integration
  ▪ Configuration Tool to Simplify Integration
  ▪ Simulation to Ensure WMS Processing Performance, Even without an Automation System in Place
  ▪ Integration Dashboard and Event Management
  ▪ All this Reduces Time, Cost, Risk
Intelligent WMS-Material Handling Integration

- WMS Communicates in Real-Time with Downstream Automation to Optimize Picking and Equipment Efficiency

WMS Releases Orders to Floor in a Way that Optimizes Sorter Utilization and Throughput
Current DC Scenario for Many

➢ Order Profiles – Driven by eCommerce and More – Continue to Evolve to Higher Levels of “Piece Picking”

➢ To Address Rising Distribution Costs from this Shift, Companies have Invested or Considered a Range of Technologies:
  ▪ Voice Picking
  ▪ Pick Carts (to Support Cluster Picking)
  ▪ Put Walls
  ▪ Pick-to-Light

➢ The Problems:
  ▪ Proprietary, Expensive Hardware
  ▪ Costly 3rd Party Software that Must Integrate with WMS
  ▪ Lack of Optimization Opportunities and Inflexibility
Current DC Scenario

- Order Batches
- Confirmations

WMS

Order Batches
Confirmations

Voice Server
Order Release Logic

Proprietary Voice Software on Phone

Put Wall Control System
Order Release Logic

Put Wall

Lights API

Pick Carts with Light

Voice Terminals
Current DC Scenario

WMS

Order Batches

Order Batches

Order Confirmations

Order Confirmations

Expensive + Interfaces + No Real-Time Optimization

Pick Cart Control System
Order Release Logic

Put Wall Control System
Order Release Logic

Lights API

Proprietary Voice Software on Phone

Voice Terminals

Pick Carts with Light

Put Wall
A Better Way

➢ Direct, Real-Time Management of Hardware and Voice Systems from the WMS
  ▪ Seamless, End-to-End

➢ Use of Commodity Hardware, Standard Smart Phones for Voice, Tablets for Visual Picking

➢ Real-Time, Advanced Order Release to Maximize Productivity and Service Flexibility
Best Approach

WMS
- Advanced Order Release
- Voice Server

Real-Time Integration

Lights API
- Pick Carts with Light

Real-Time Integration

Graphical View for Tablets
Voice Software Already on Phone

Tablet
Smart Phone

Put Wall
Best Solution

WMS
- Advanced Order Release
- Voice Server

Low Cost Commodity Hardware + No Interfaces + Advanced Real-Time Optimization

Real-Time Integration

Lights API
Pick Carts with Light

Tablet
Smart Phone

Lights API
Put Wall

MHI
The Industry That Makes Supply Chains Work®
Best Solution
Approach Enables Dynamic Work Assignment

Worker Selects Cart

- Worker Identifies Cart via Scan/Voice
- System Knows Cart Configuration – Fixed or Flexible
- Any Worker Can Use Any Technology:
  - RF, Voice, Lights, Tablet, Multi-Modal
  - Uniquely Abstracted Task Assignment from Technology Used
- Cartonizes Order Pool
- Assigns Orders to Carts to Maximize Picking Efficiencies
  - Number of Pickers
  - Priority
  - Cluster Picking Opportunities
  - Shortest Travel Path
  - Threshold Levels
- “Butterfly Tasks” Supported
- Batch Pick Supported
- Pick and Pass at Cart or Carton/Tote Level Supported
- When Cart Complete, Directed to
- Move to Staging
Substantial Benefits

➢ Use of Commodity Hardware for Carts, Walls and Lights Reduces Costs by as Much as 70%
  ▪ Put in your pocket, or add more carts/walls/light systems
➢ Use of Smart Phones with No Additional Software Required Saves Thousands of Dollars Per Unit
➢ Elimination of Interfaces to 3rd Party Software Simplifies Implementation and On-Going Maintenance, Reduces Costs
➢ Advanced Order Planning and Dynamic Release Drives Double Digit Productivity Gains
➢ Integrated Picking and Packing System Provides Operational Flexibility
➢ Customer Can Leverage what They Have, Add-On with Complete Modularity
Distribution Process Optimization

➢ “Optimization” by Definition Requires Consideration of Resources and Constraints
➢ WMS Historically has Considered Relatively Few Variables, Acted on Simple Rules, to Make Decisions
➢ Next Gen WMS Makes Use of:
  ▪ Comprehensive Real-Time Awareness of Resources and Constraints
  ▪ Sophisticated Rule Engine
  ▪ Process-Decision Algorithms
Distribution Process Optimization

Customer Orders
Inbound Receipts

DC Resources and Constraints

Advanced WMS Rules Engine
Algorithms

Order Planning
Waveless Picking
Dynamic Allocation/Pick Routes
Dynamic Slotting
Dynamic Replenishment

Intelligent Exception Handling
Simulate Impact of Process Changes Before Deployment

➢ Make Changes Reflecting Process/Equipment Changes in WMS Test Server
➢ Select Date(s) in History
➢ “Play Out” that Day’s Data to See Impact on Throughput, Cost
➢ New Dimension to Distribution Simulation
Beyond Picking, WMS Users Will Interact with the System Using Voice

“I need a replenishment for Location CD05N2”

“Where are we on the last wave?”
Summing It Up

➢ Many Next Gen WMS Capabilities are Here Today for Some Providers
➢ Architecture and Platform Really Do Matter
➢ Constraint-Based WMS Process Execution Can Deliver Significant Cost/Throughput Gains
➢ Many Other WMS Advances Still Possible
  ▪ Dynamic Task-to-Worker Capabilities
  ▪ Artificial Intelligence/Machine Learning
  ▪ Integration with IoT Demand Signals
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