Warehouse Management Systems 2020: That Was Then – This is NOW.

Presented by:

Dinesh Dongre

Dan Gilmore

Softeon

MODEX 2020

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Presenters

Dinesh Dongre
VP Product Strategy
Softeon, Inc.

Dan Gilmore
CMO
Softeon, Inc.

WMS Market Remains Very Active

Drivers of New WMS Projects:

- New Facility
- Companies Experiencing Rapid Growth
- Companies Making Significant Logistics Strategy Changes
- Companies Consolidating Facilities
- Companies Significantly Increase DC Automation
- Rising Distribution Costs
- Current WMS Technology is Really Old (“Burning Platform”)
- New Omnichannel Fulfillment Requirements
- Interest in Cloud-based System

Exciting New WMS Capabilites are Emerging

- 20 Years of Only Incremental Improvement in WMS Capabilities
- Market is Ready for Something New

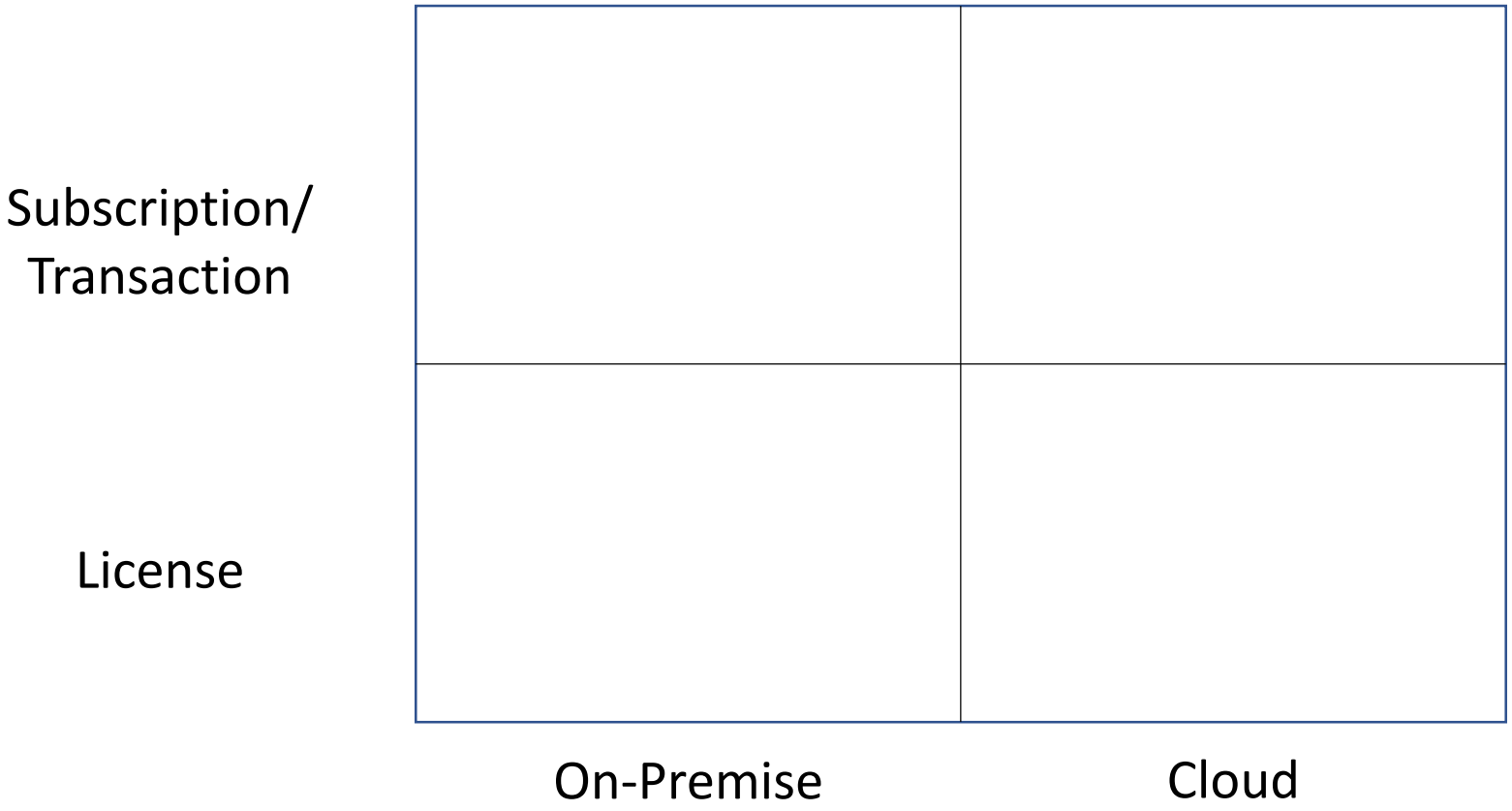
Five Exciting New WMS Trends

- WMS in the Cloud
- Use of Templates and Wizards
- Integrated Support for Picking Sub-Systems
- Conversational Voice
- WMS + WES

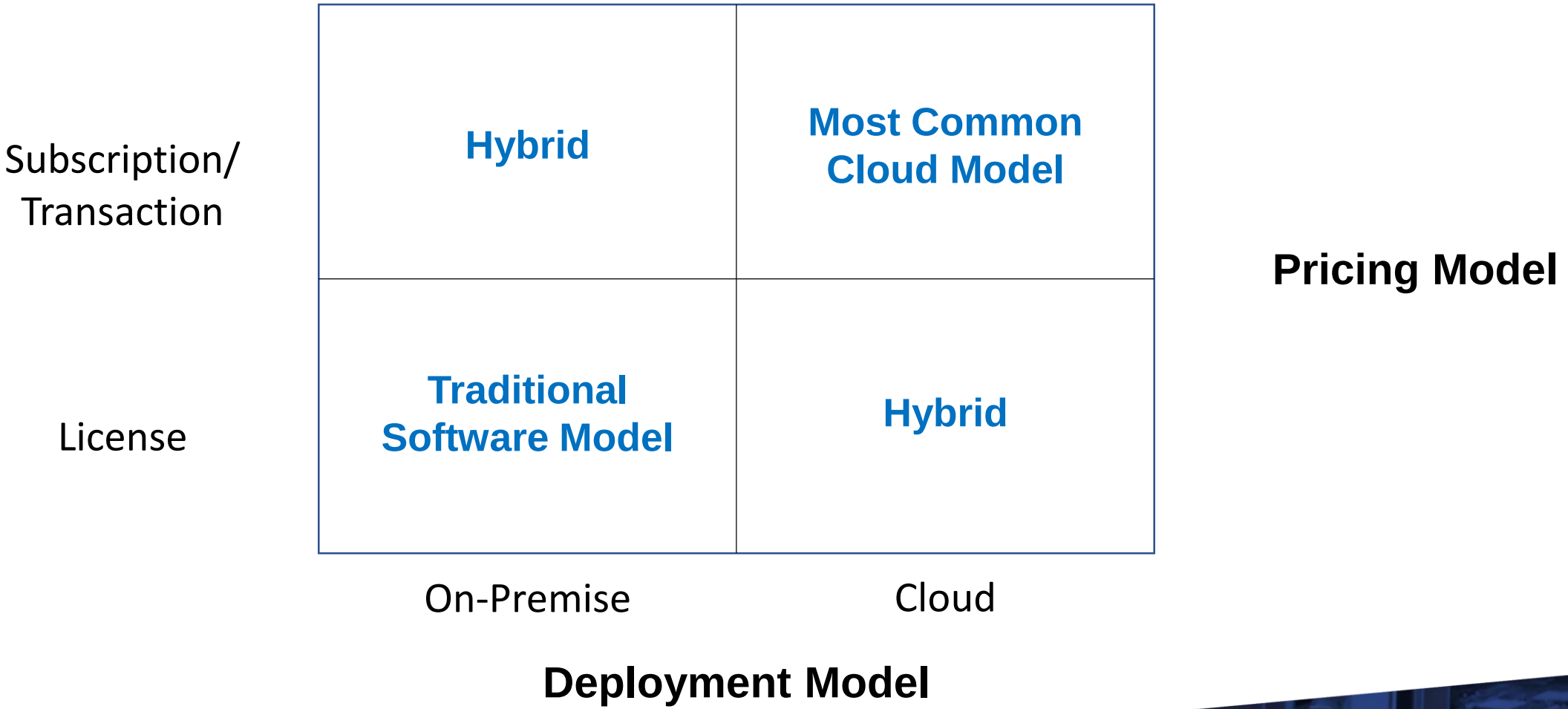
#1: WMS Moves to the Cloud

- 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

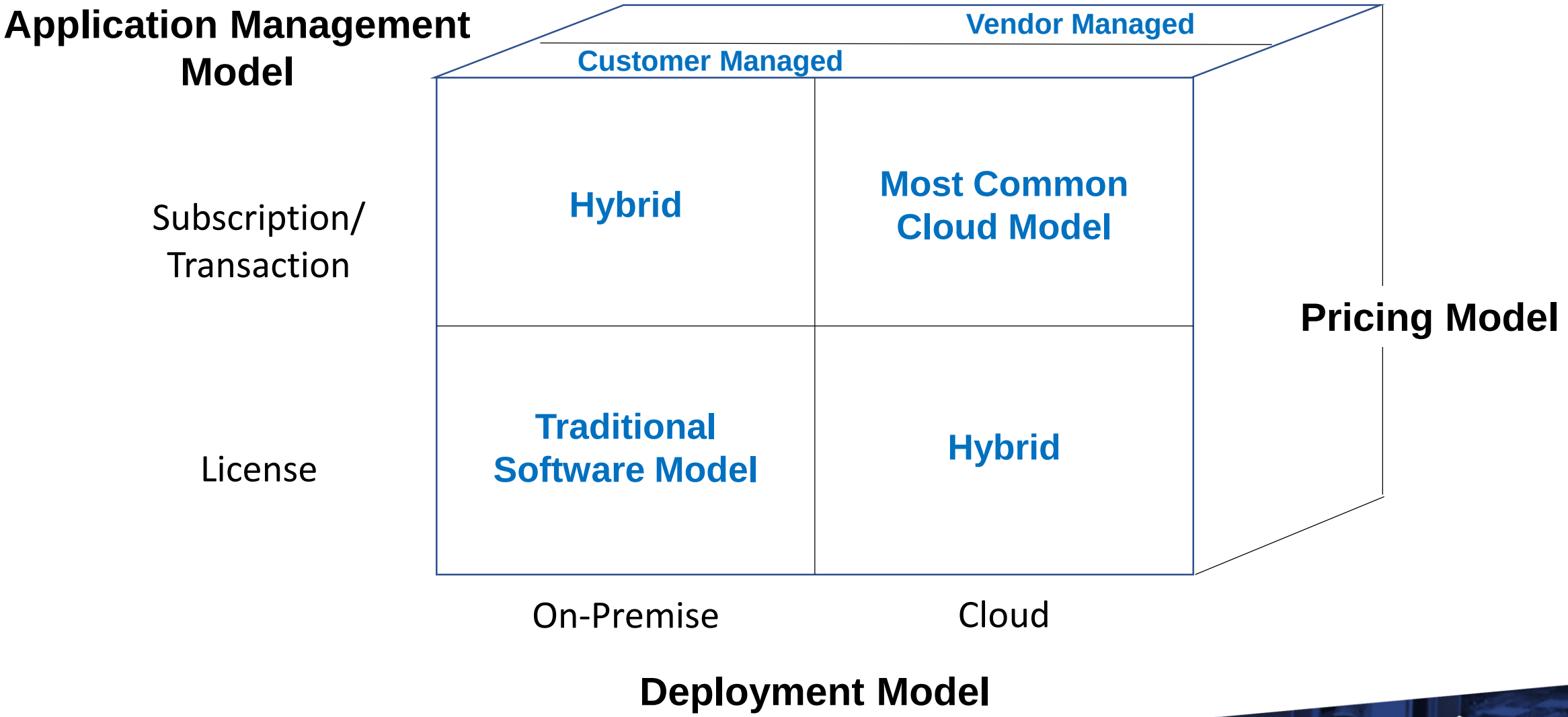
Understanding Pricing and Deployment Options



Understanding Pricing and Deployment Options



Understanding Pricing and Deployment Options



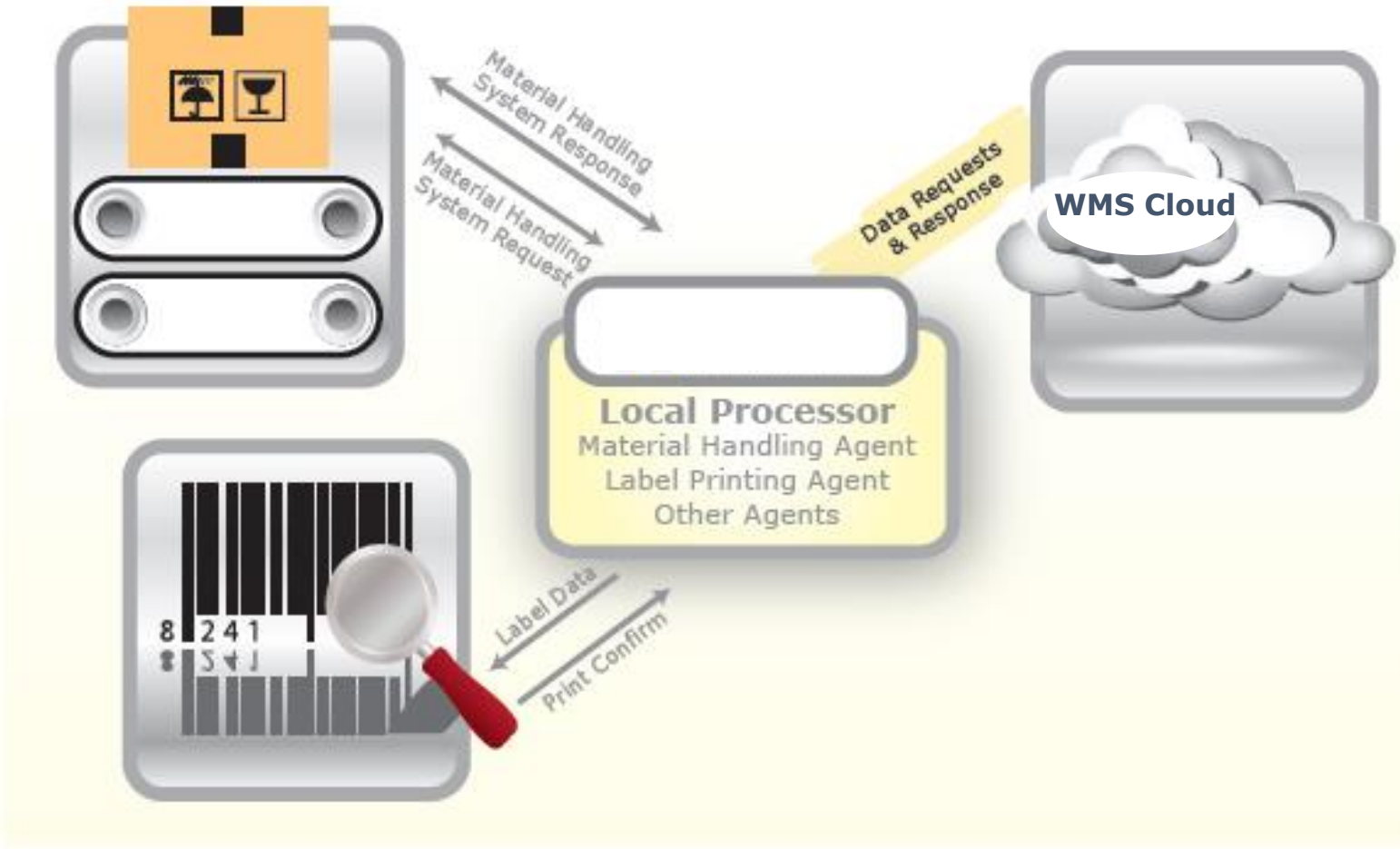
WMS Moves to the Cloud

The Promise: Varied Distribution Network – One WMS Solution

Move from On-Premise to Cloud with No Data Migration

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

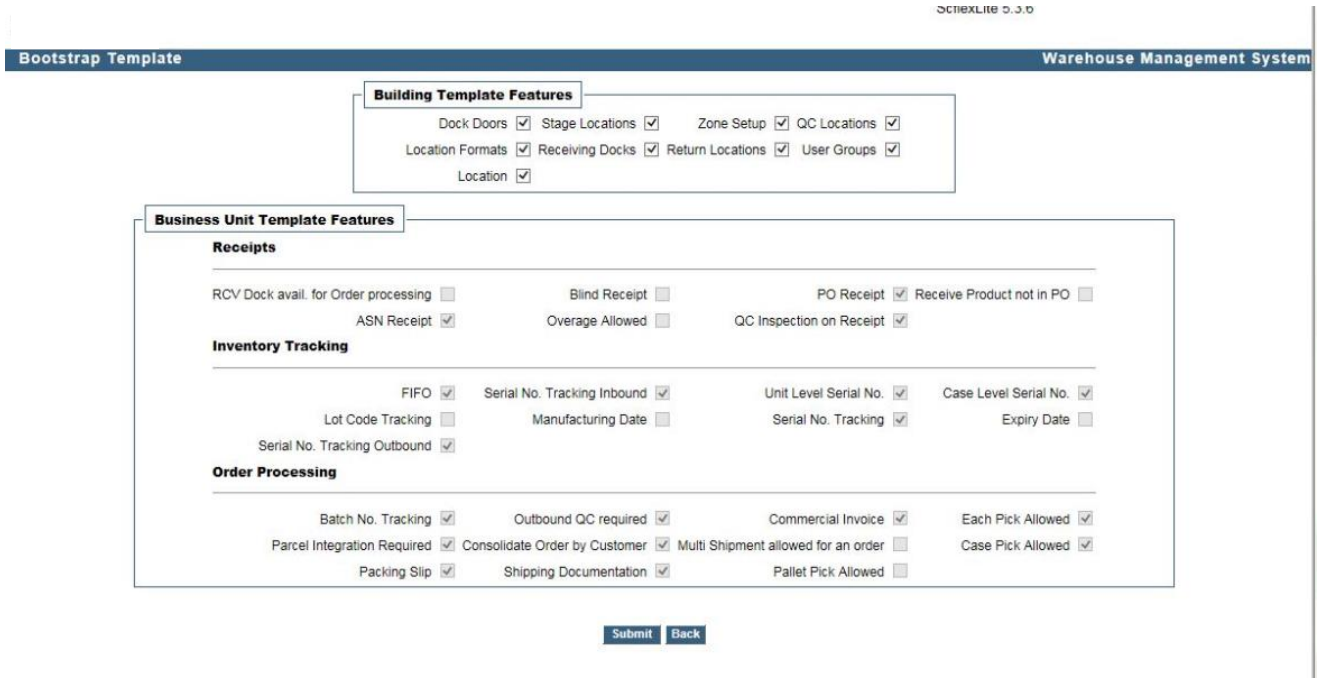
WMS Moves to the Cloud

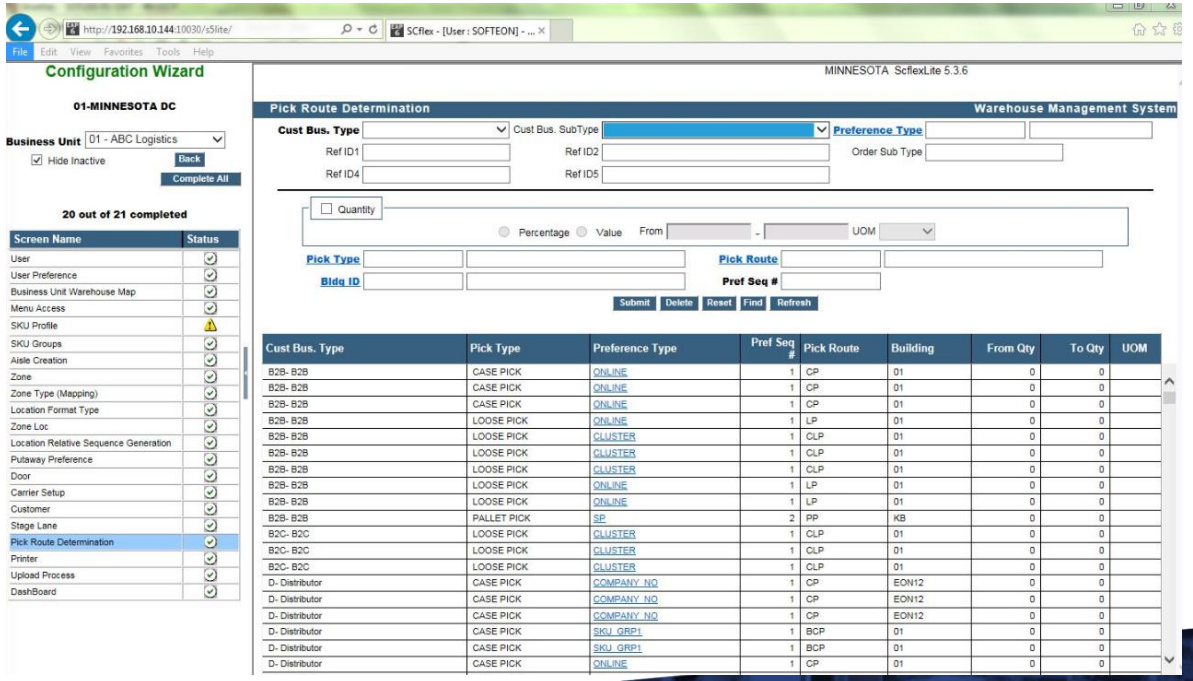


Support for Hybrid Deployment

2: Use of Templates and Wizards to Transform WMS Deployment

- WMS Deployments Remain Very Difficult, Costly and Risky
- Many WMS Providers have tried Using Templates - Never Worked Very Well
- Now - New Approaches that Not Only Reduce Effort/Costs - Prevent Mistakes





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3 – Integrated Support for Picking Sub-Systems

- High Interest in a Variety of MHE Technologies
  - High Automation
  - Mid-Level Automation: Voice, Smart Carts, Pick-to-Light, Put Walls, Mobile Robots, etc.

- Current Approach is Limited
  - Throw Orders “Over the Wall” to Sub-Systems, Receive Confirmations Back
  - Limits Flexibility, Optimization and Exemption Handling

- A Better Way has Emerged

Each Sub-system with its Own Control Software

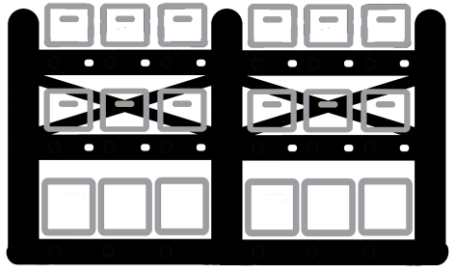
Voice Server
Order Release Logic

Voice terminals

Pick Cart Control System
Order Release Logic

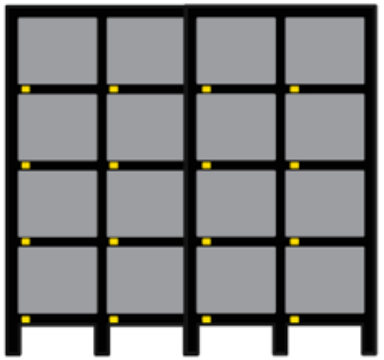
Smart carts

PTL Control System
Order Release Logic



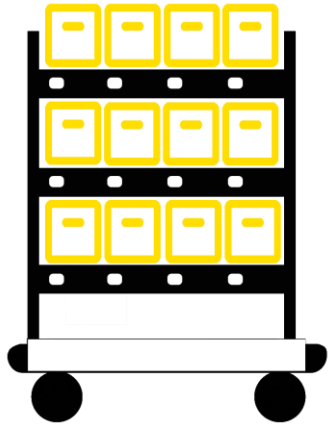
Pick-to-light

Put Wall Control System
Order Release Logic



Put walls

Robot Control System
Order Release Logic



Mobile robots

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Each Sub-system with its Own Control Software

Voice Server
Order Release Logic

Voice terminals

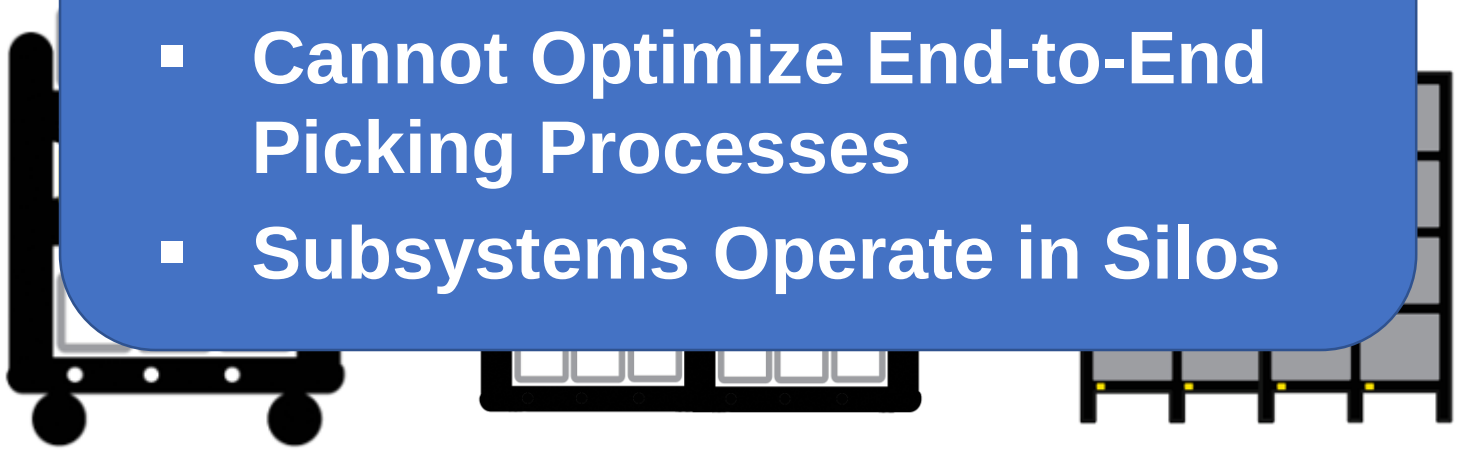
Pick Cart Cont… C…

PTL

Put Wall …om

Issues:

- **High Cost Hardware**
- **Cannot Optimize End-to-End Picking Processes**
- **Subsystems Operate in Silos**



Smart carts

Pick-to-light

Put walls

Robot Control System
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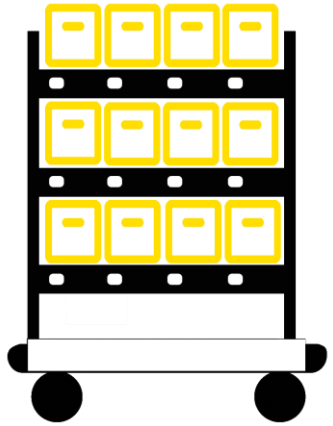

Mobile robots

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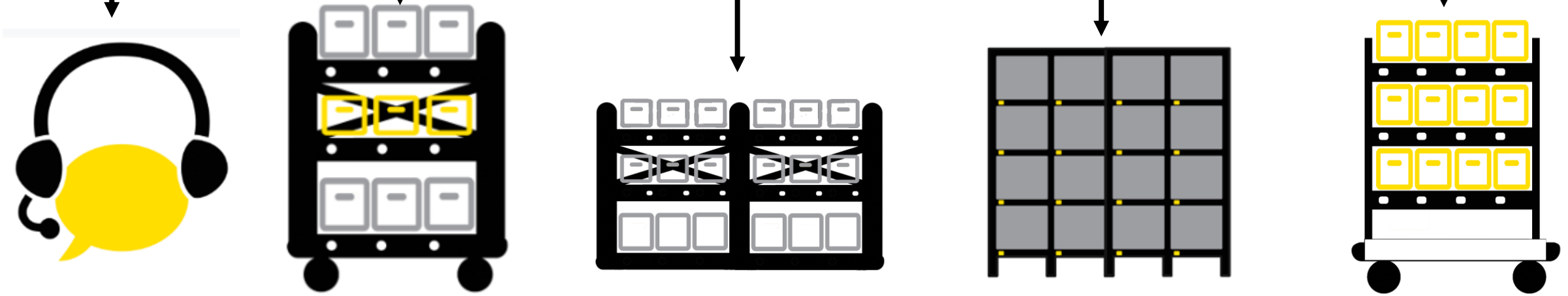
The Better Way

WMS

Real-Time API Integration

Real-Time API Integration



Voice terminals

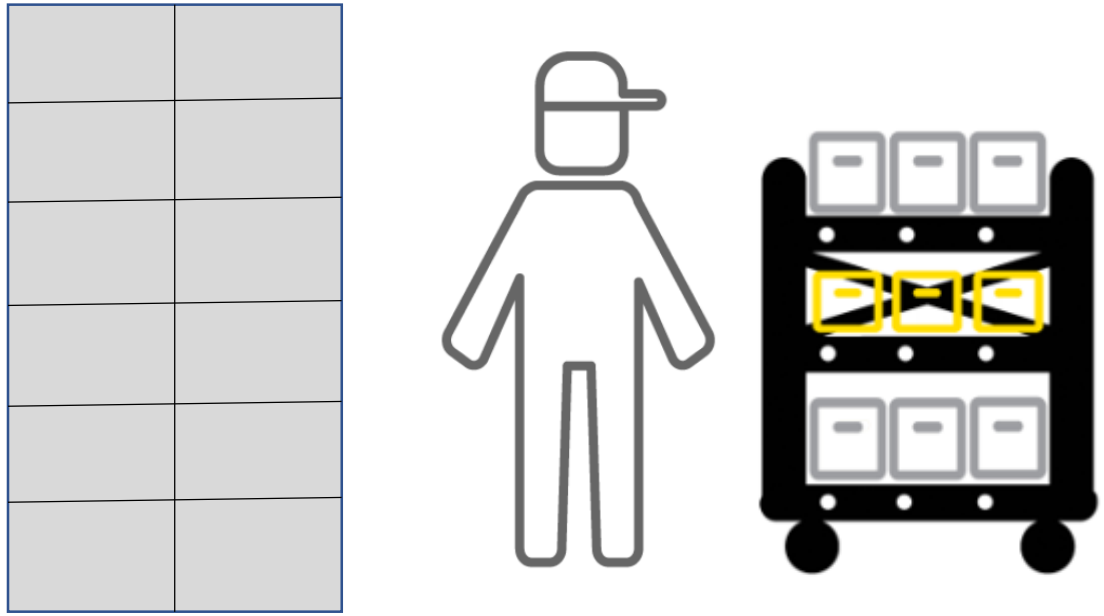
Smart carts

Pick-to-light

Put walls

Mobile robots

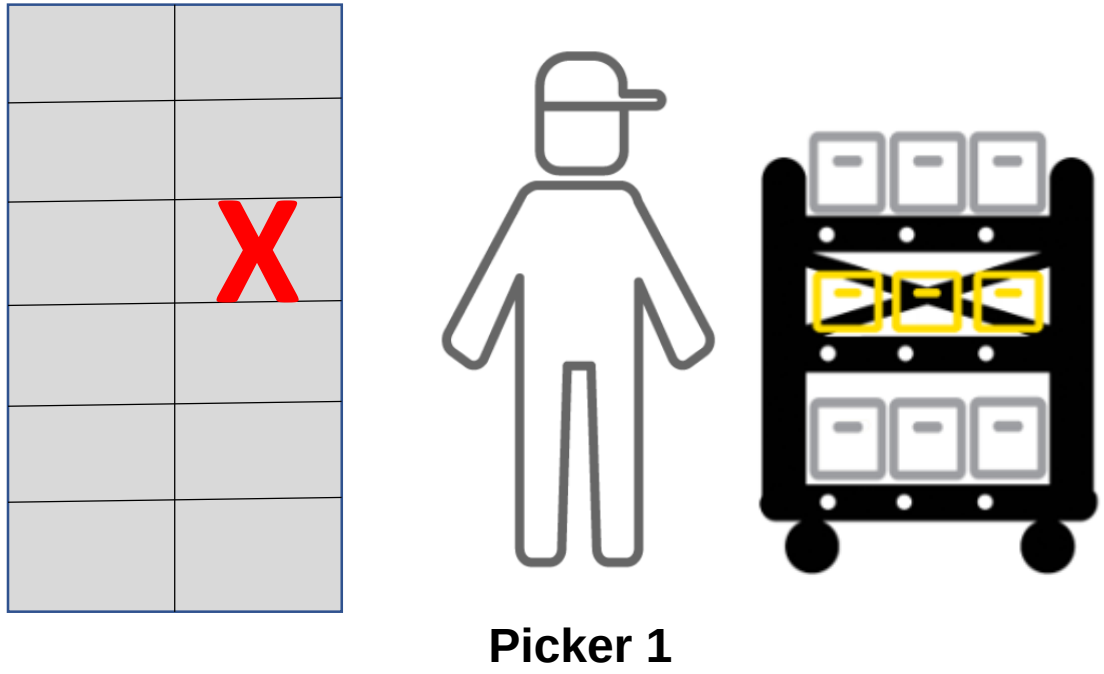
Example: Robotic Helper Task



Picker 1

Scenario: Piece Picking from Forward Pick Areas Only

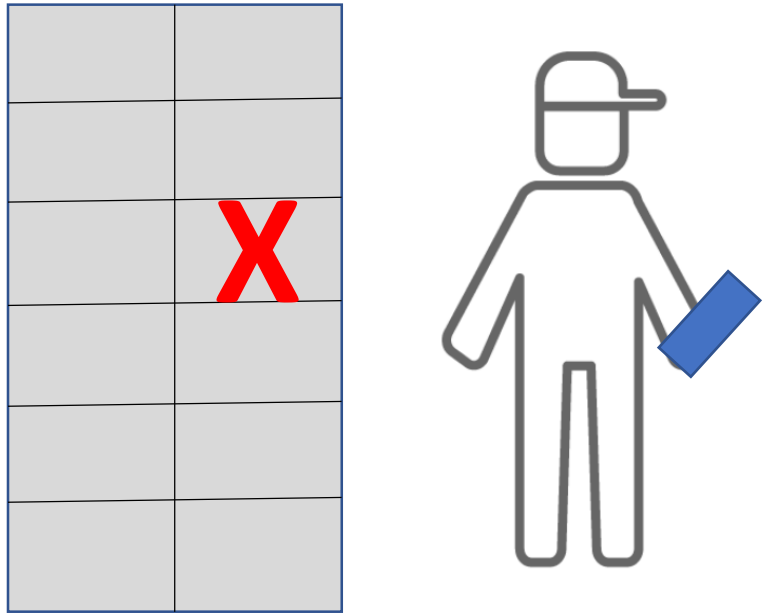
Example: Robotic Helper Task



1

- Picker Arrives at Pick Location
- Expected Inventory not There
- Cluster Picks for One or More Orders Must be Skipped
- Can be “Short Picked” or Skipped

Example: Robotic Helper Task

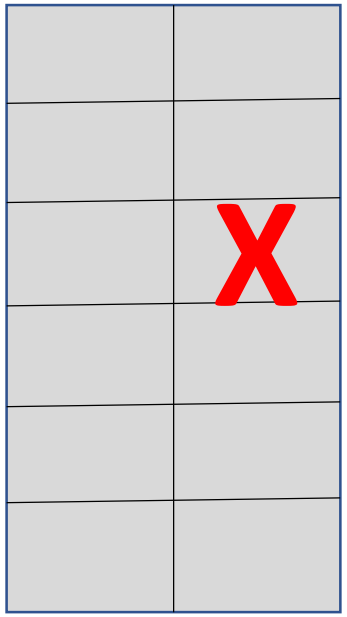


Picker 1

2

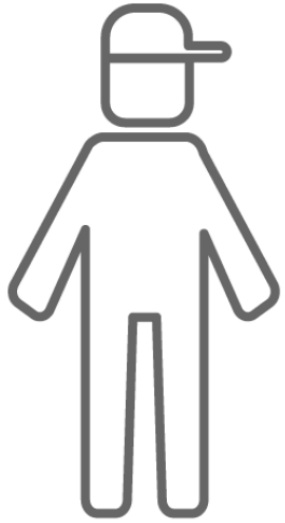
- System Generates High Priority Cycle Count
- Associate Confirms Inventory Shortage
- High Priority Replenishment Task is Generated

Example: Robotic Helper Task

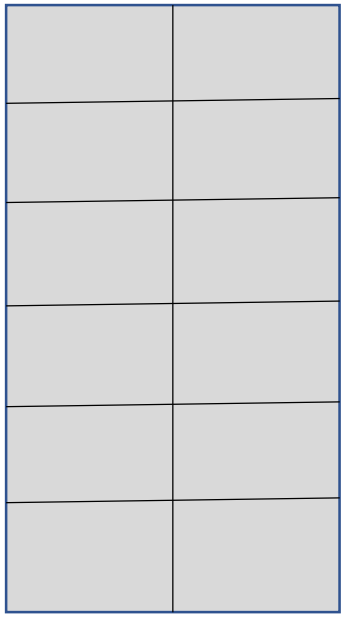


3

- Picker Works on Remaining Picks
- If Complete, Picker Takes Totes to Packing, where Totes with Missing SKUs are Directed to “Hospital” Area



Picker 1



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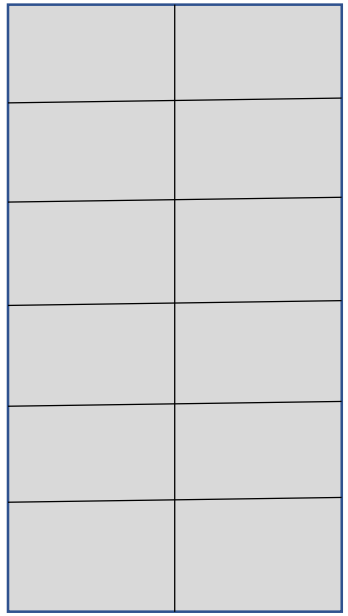
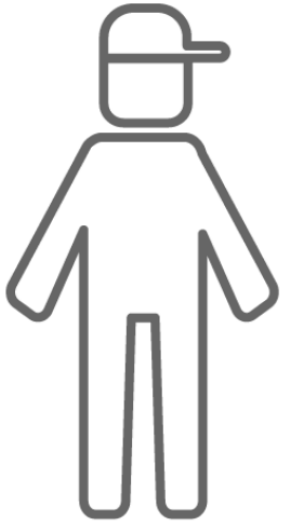


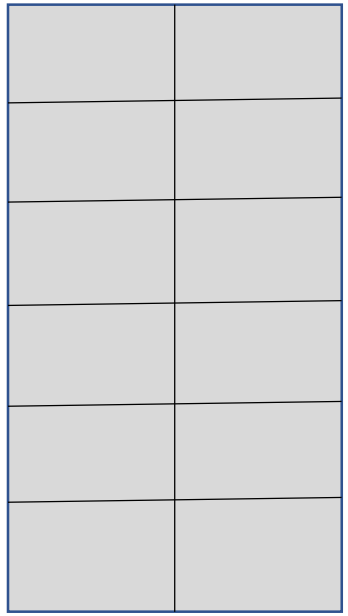


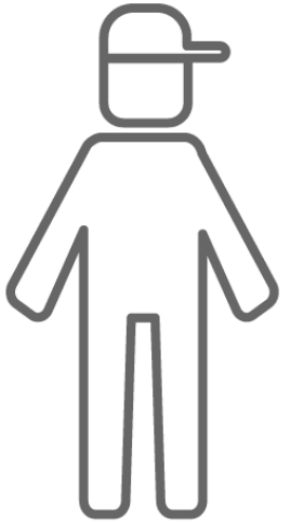
Picker 2

4

- Original Picking Location is Replenished

Example: Robotic Helper Task





Picker 2

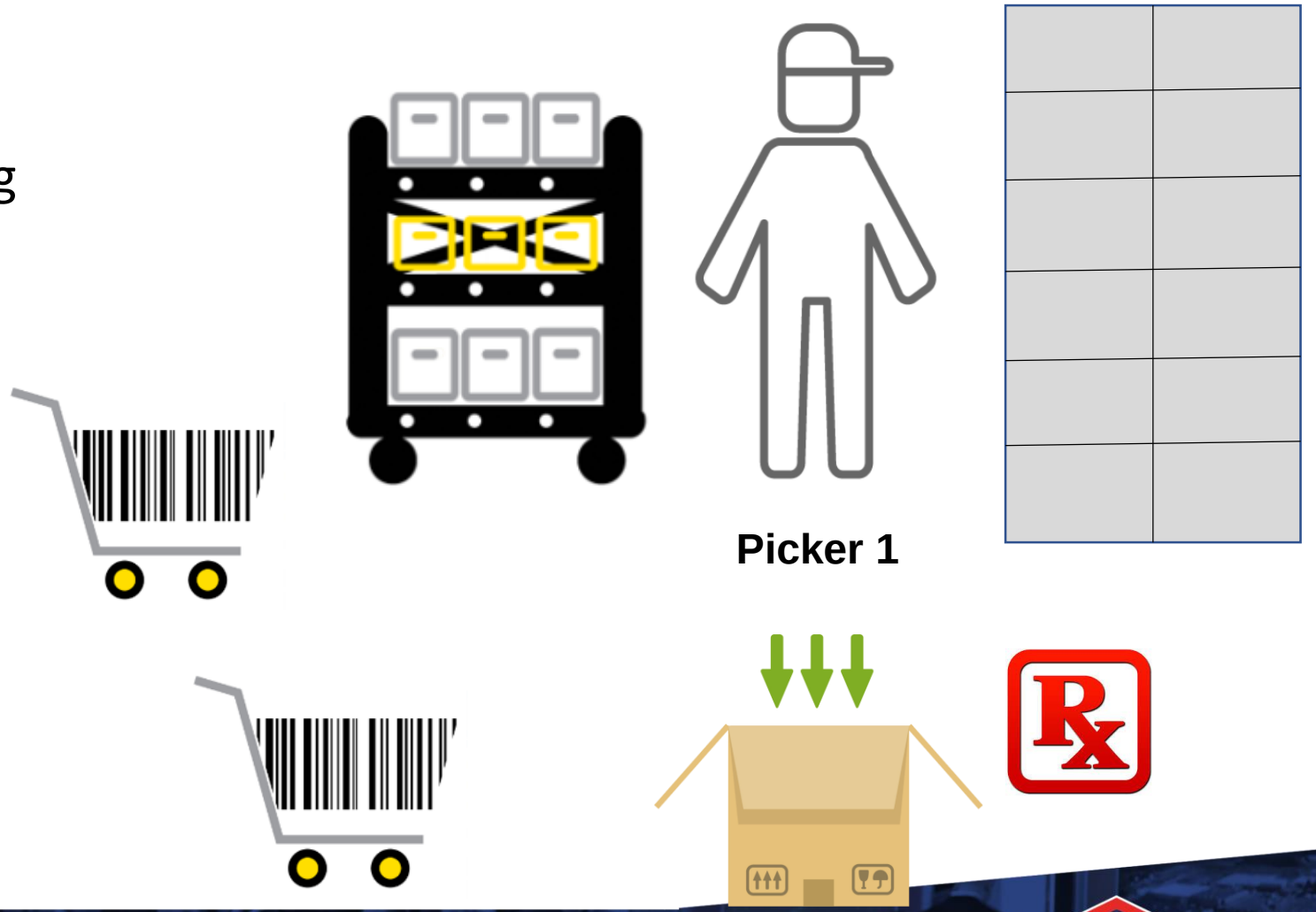
5

- Robot Arrives at Original, Now Replenished Forward Pick Location
- As New Picker Approaches Location, He/She is Given a New Task – Pick the Shorted Item and Put on Robot
- Robot Match Confirmation RTLS
- The “New Task Interleaving”

Example: Robotic Helper Task

6

- Mobile Robot Takes Missing SKUs to Packing Hospital Zone, where they are Packed to Complete the Orders
- Alternatively, Robot Can Meet the Picker in Route if Picks are not Complete



Substantial Benefits from this Approach

- 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 and Voice App 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

4 – The Rise of Conversational Voice

- Use of Voice Beyond Order Picking
- Starts with Metrics and Status Update
- Evolved to more Full Blown Dialog

Will be the Primary Way Users Interact with the WMS

"I need a replenishment for Location CD05N2."

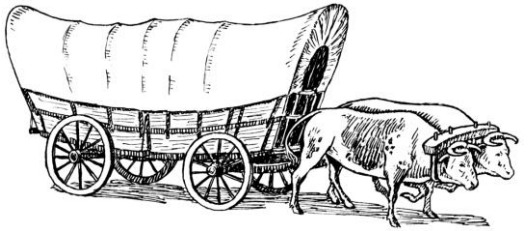
"Where are we on the last wave?"

5 – The Integration of WMS and WES

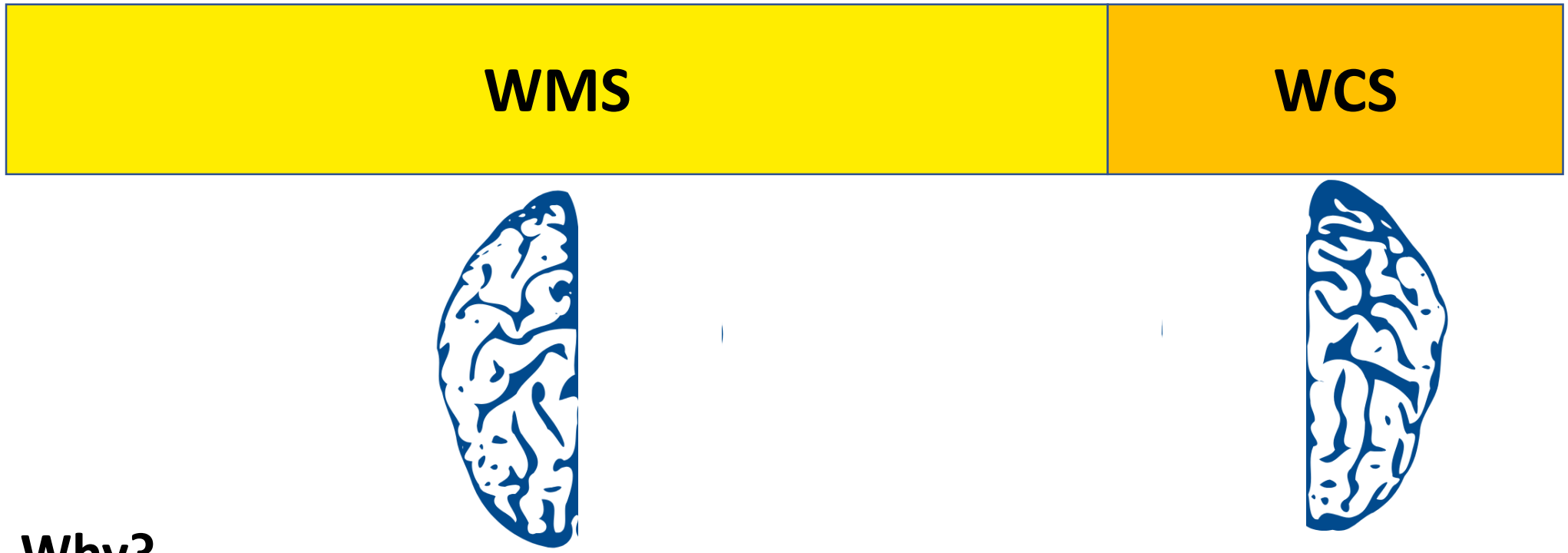
- Warehouse Execution Systems (WES) Move Beyond Current Applications in Heavily Automated DCs
- Rise of the Warehouse Management and Execution System
- Simulation, Optimization and Orchestration
- Step Change in WMS Capabilities
- Headed to the New Era of the “Autonomous WMS”

How We Got Here

WMS	WCS



Some Implementations

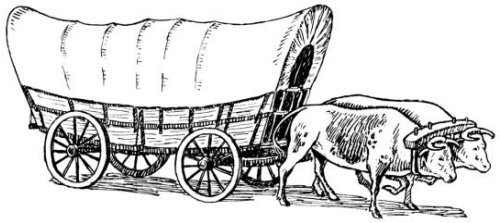


Why?

- Lack of WMS Capabilities
- MHA Vendor in Control of Customer
- Agreements between WMS and WCS Vendor

New Dynamic in Some Scenarios

WMS	WES	WCS



Why?

- WES only Developed Due to Perceived Shortcomings in WMS
- True for Some, not for All
- Visibility to Process/Work Area Status
- Flow of Work Based on Capacities and Work Load
- “Waveless” Processing

WES Addresses Common Distribution Problems/Opportunities

- Lack of Granular Visibility to Throughput and Order Execution
- Labor Planning Challenges
  - Right Resources not in Right Place at Right Time
- Time/Cost/Approach of Adding Technologies (e.g., Picking Sub-Systems)
- Sub-Optimal Picking Execution
- Difficulty Meeting Carrier Cut Off Times/Ensuring SLAs
- High Variability in Materials Handling Equipment Utilization
- WMS Still Highly Reliant on Human Decision-Making

Fundamental New WES Value Proposition

- Enables Companies to Meet Customer Demand and Service Commitments at the Least Possible Cost
- Significantly Shrinks the Gap Between Theoretic and Realized DC/System Throughput
- Single System for Management and Control of Fulfillment Across the DC
- Integrated with WMS for Complete Solution
- Automated, Manual or Hybrid DCs

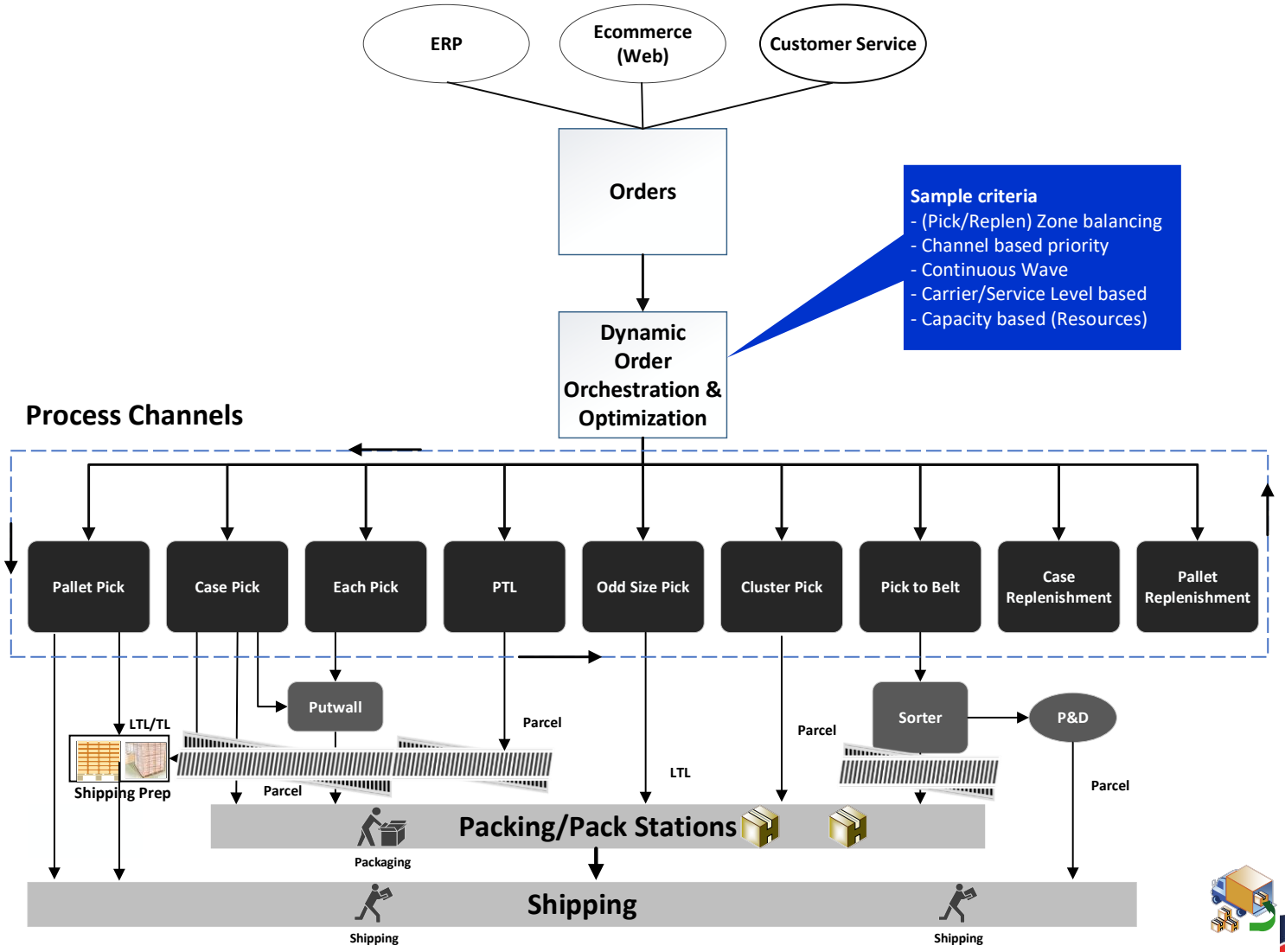
How WES Delivers Results

- Real-Time Visibility to Throughput, Bottlenecks and Events
- Direct Management and Optimization of Picking Sub-Systems
- Advanced, Configurable Optimization for Order Batching, Release, Picking and Replenishment
- Workload Balancing to Maximize Equipment Utilization and Flow
- Automated Order Release Based on Service Commitment, Shipping Schedules and Real-Time Condition Monitoring
- Use of Simulation to Plan, Re-plan and Allocate Resources

Dynamic “Aware” Pick Release Management

Condition and Event Monitor

Advanced Scheduler



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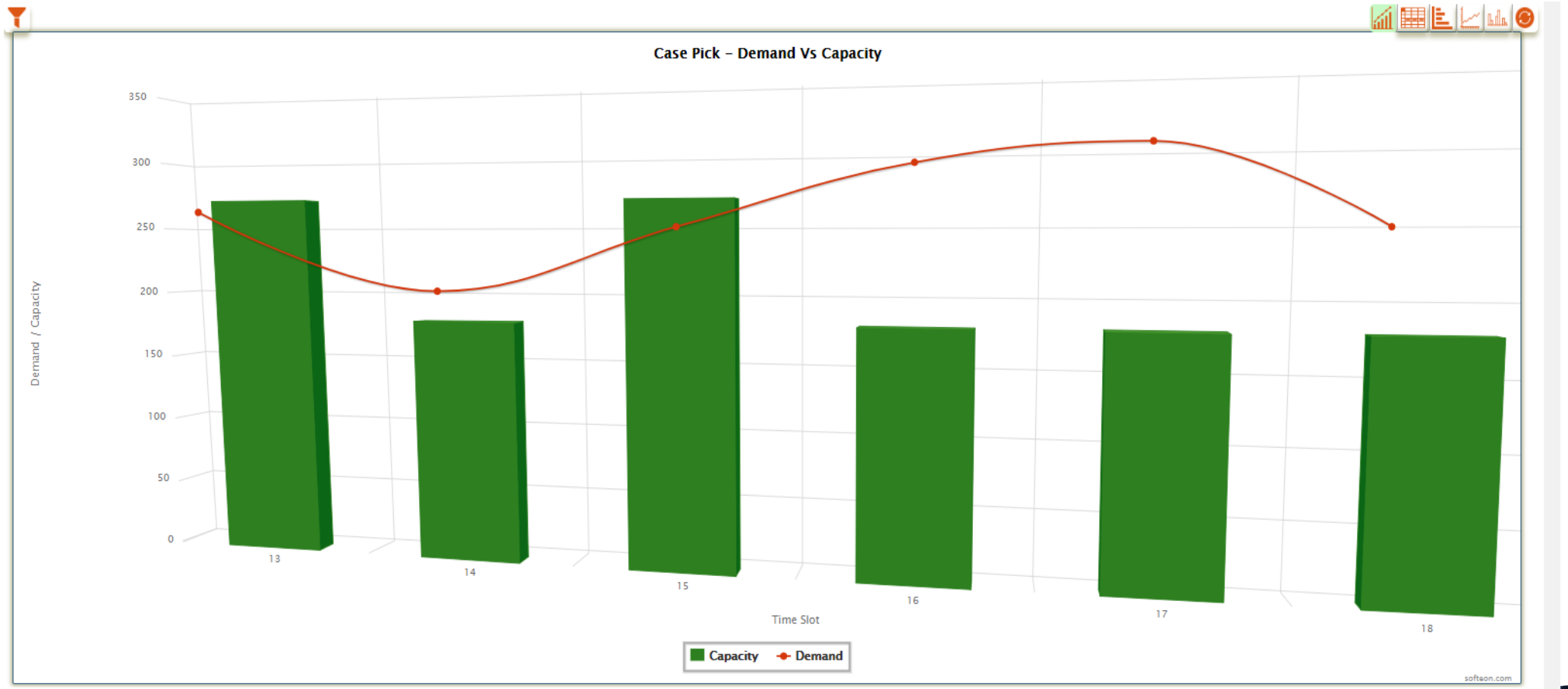
Demand v/s Capacity Dashboard from Simulation



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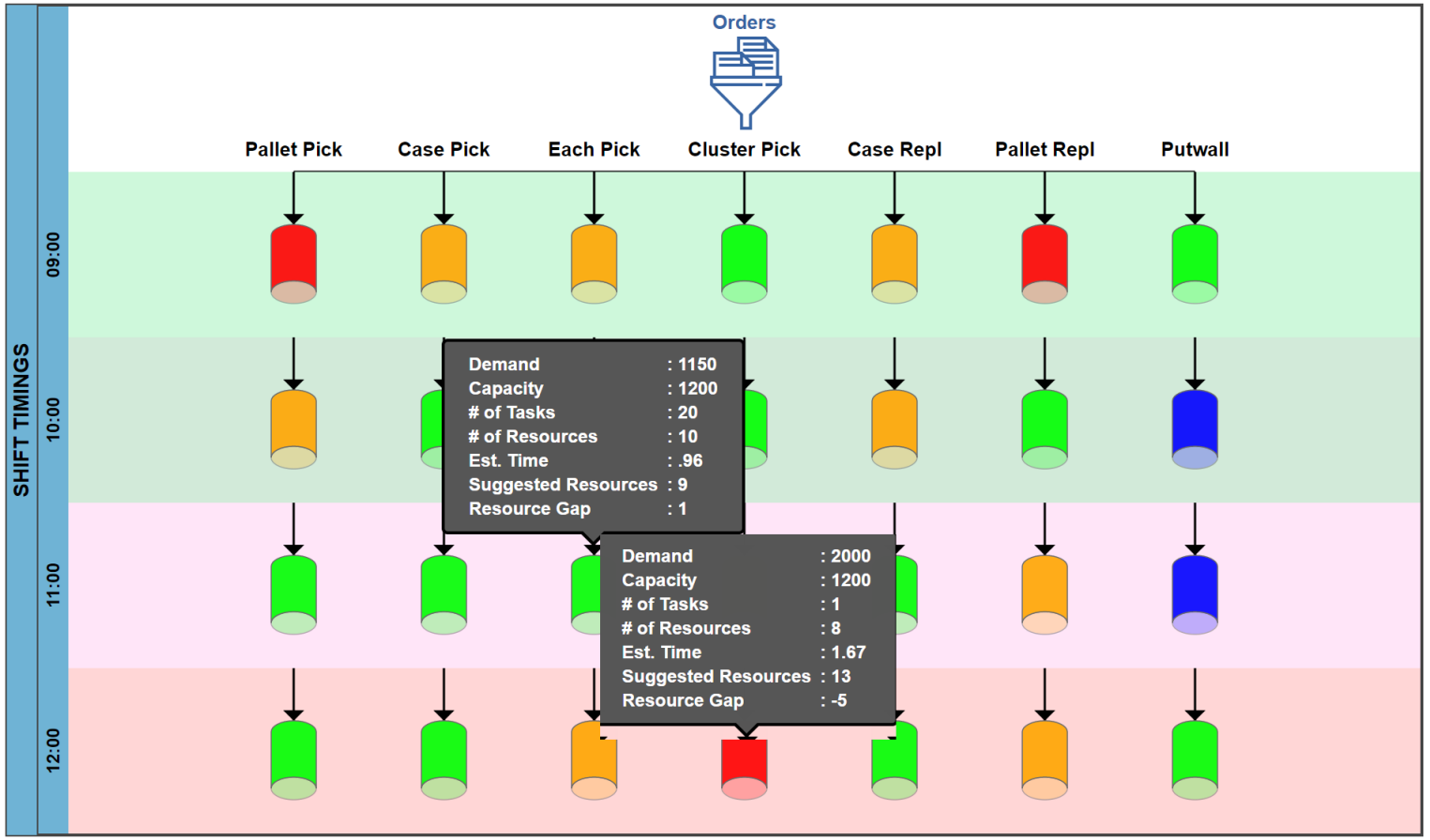
Dynamic Capacity Management Using Simulation



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Benefits of Next-Generation WES

- Double Digit Improvement in Labor Productivity
- Significant Reduction in Supervisory Overhead
- Reduced/Better Managed Overtime
- Improved Throughput
  - Closing Gap between Theoretic and Actual Throughput of a Facility
- Easily and Quickly Evaluate and Deploy New Sub-Systems/Technologies
- Consistently Meet Service Commitment with Little “Chaos”
- Improve MHE Utilization
  - Additional Throughput or Reduce Required Capacity

Benefits Applicable to Automated, Manual and Hybrid DCs!

Where We Are Headed

- **Beginning of an Era of Autonomous Warehouse Software**
  - Automated Decision-Making
  - Self-tuning (in part through use of AI/ML)
- **Advanced Focus on Product and Process Flow**
  - Reduce/Eliminate Process Bottlenecks and Dwell Times
  - Flow Distribution™

Q + A

For more information:

Speaker #1 email: **DDongre@Softeon.com**

website: **www.Softeon.com**

Speaker #2 email: **DGilmore@Softeon.com**

website: **www.Softeon.com**

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