

Key Trends in Automation that will change the DC Forever

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The greatest supply chain show on earth.



Presented by:

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The Right Solution for the Job



WMS, WCS, WES, Oh My!!!



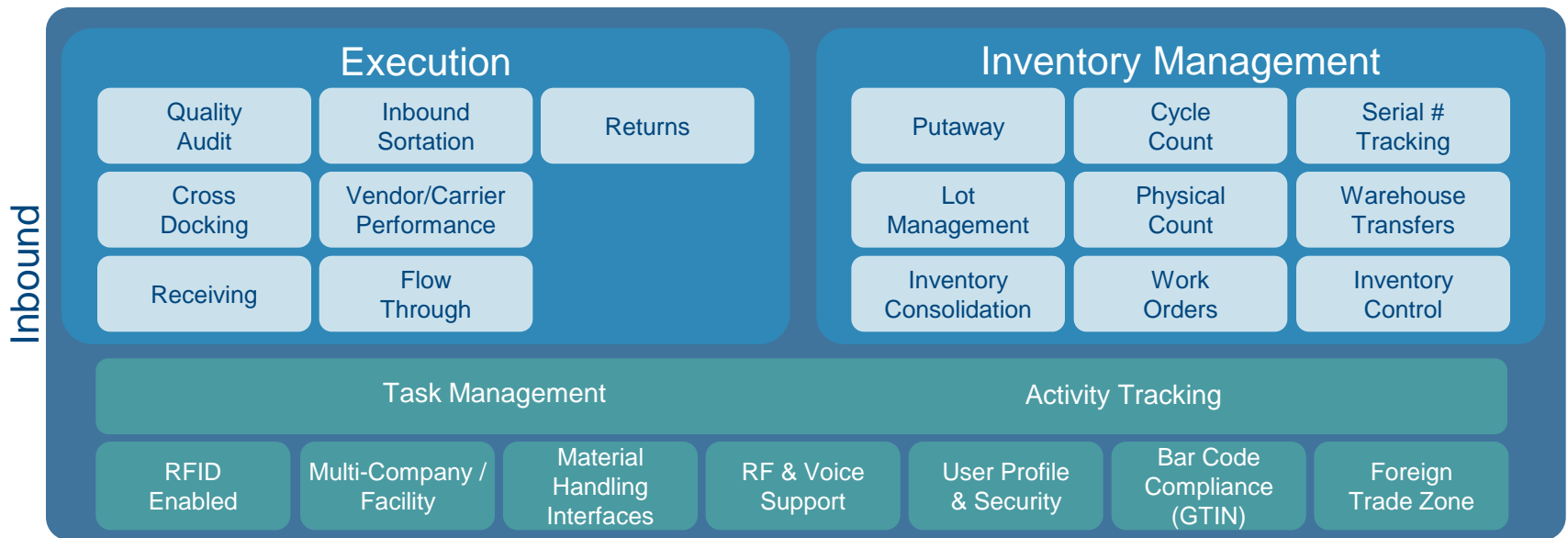
Wave, Waveless,
or Order Streaming





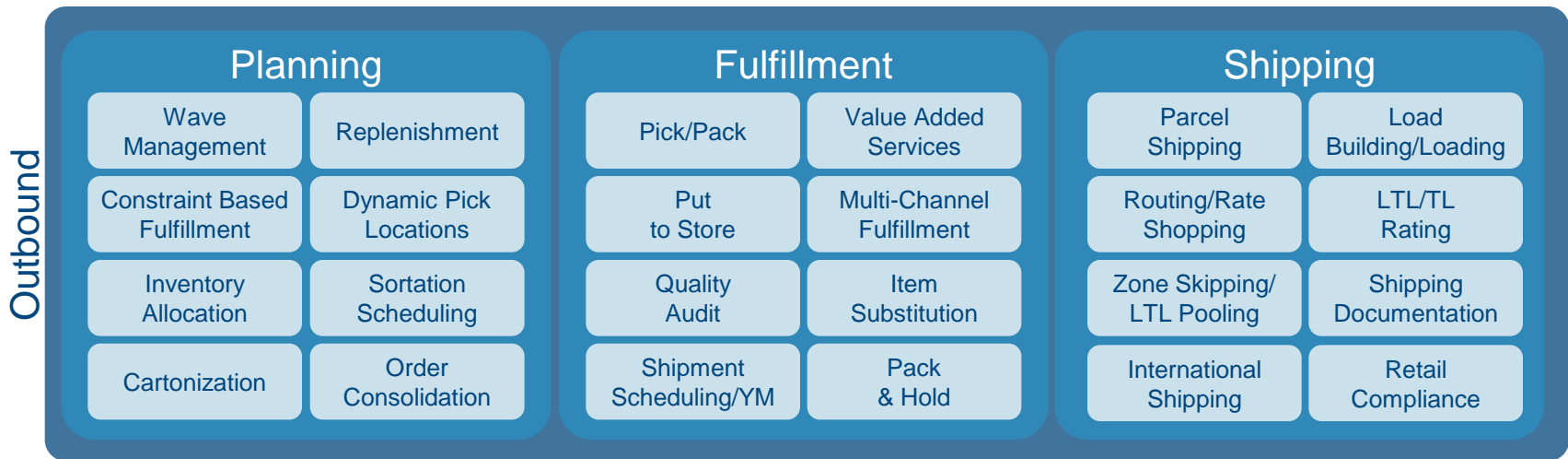
Core WMS Capabilities

Inbound Processing

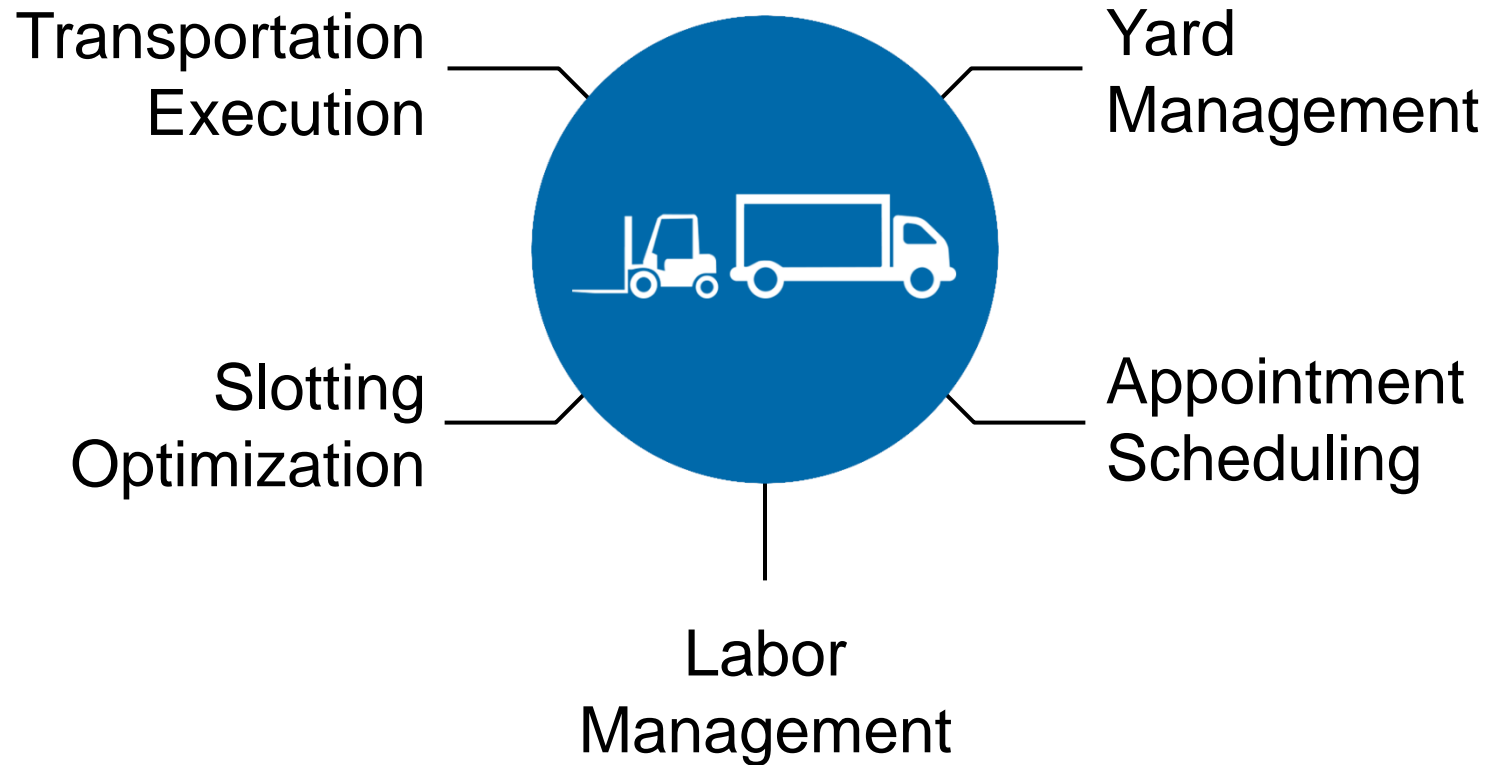


Core WMS Capabilities

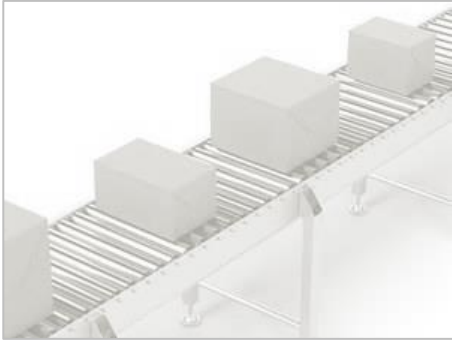
Outbound Processing



Extended WMS



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What if you could realize...

10% - 15%
improvement in
packing efficiency

5-7%
Improvement in
sorter utilization

15% increase in
order fulfillment capacity



Order Streaming for eCom

Wave Processing	Order Streaming
Batches of Orders	Order by Order
Optimized Picking	Proactive Replenishment
Some Labor Peaks and Valleys	More Constant Labor Utilization
Sub-Optimal for Individual Orders	Optimal Individual Order Throughput



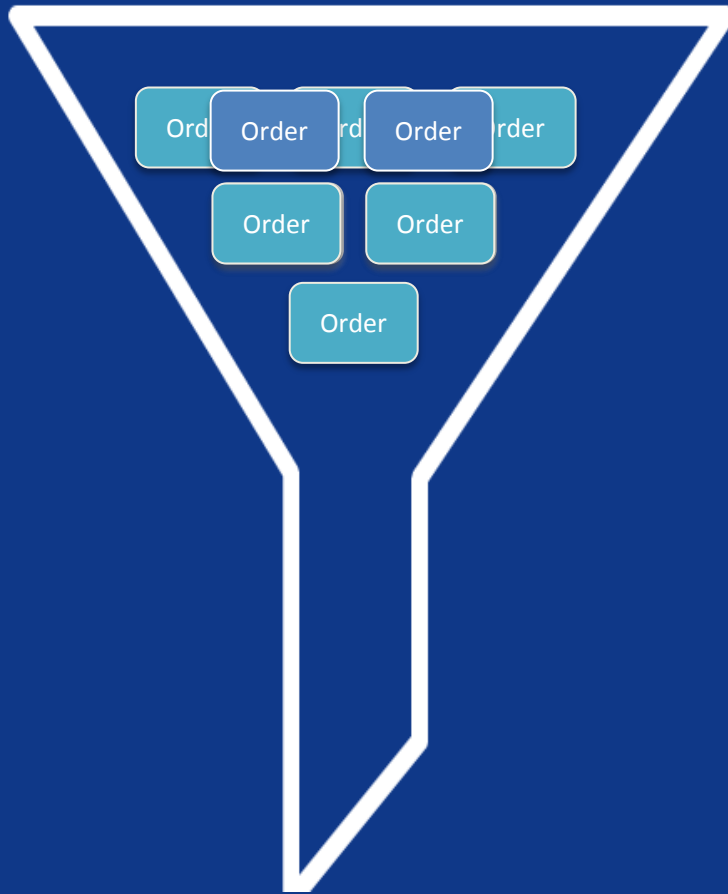
Order Streaming Overview

Fulfillment of direct orders presents unique challenges

- Utilization of expensive equipment
- Peaks and valleys in labor
- Changing priorities and constant order acceptance



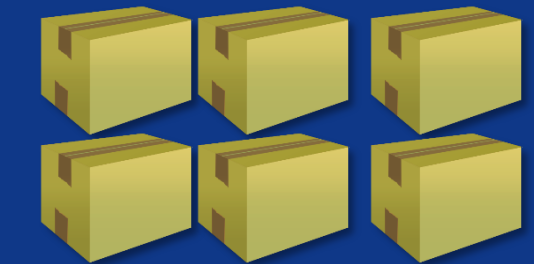
Traditional Order Fulfillment via Wave-driven Batches



PICKING



SORTING

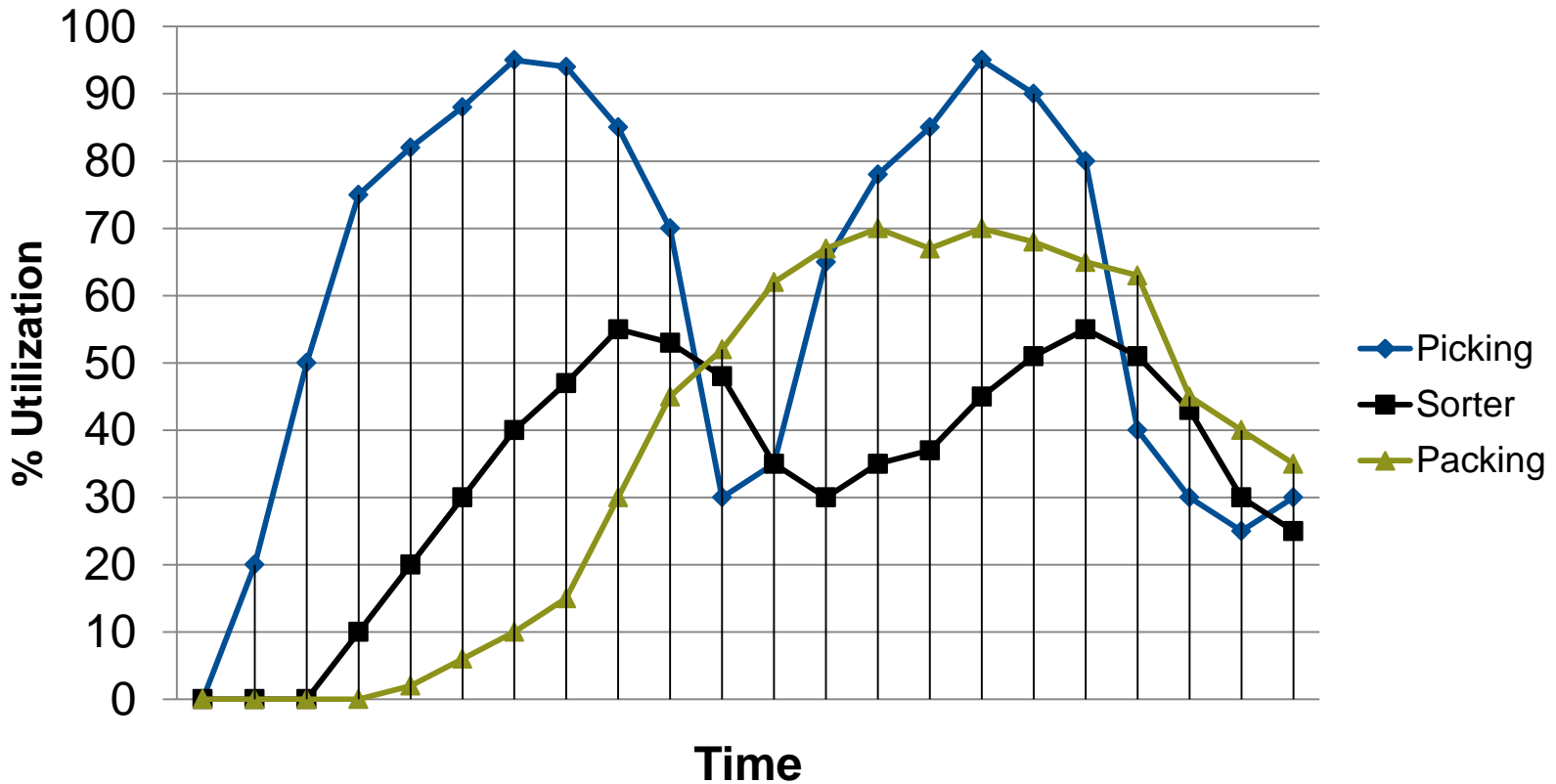


PACKING

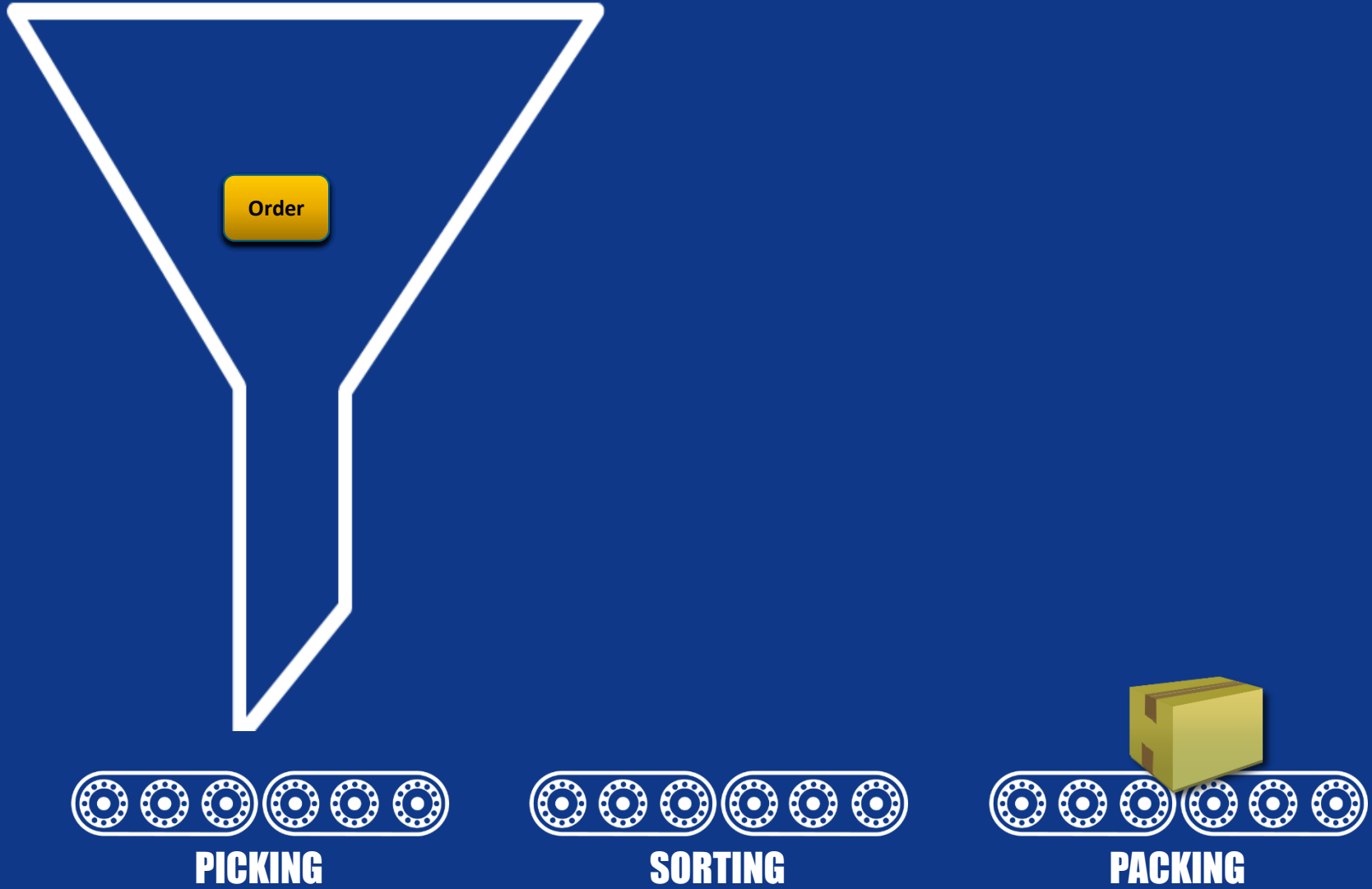


Traditional Order Fulfillment via Wave-driven Batches

Peaks and valleys in labor



Order Fulfillment with Order Streaming

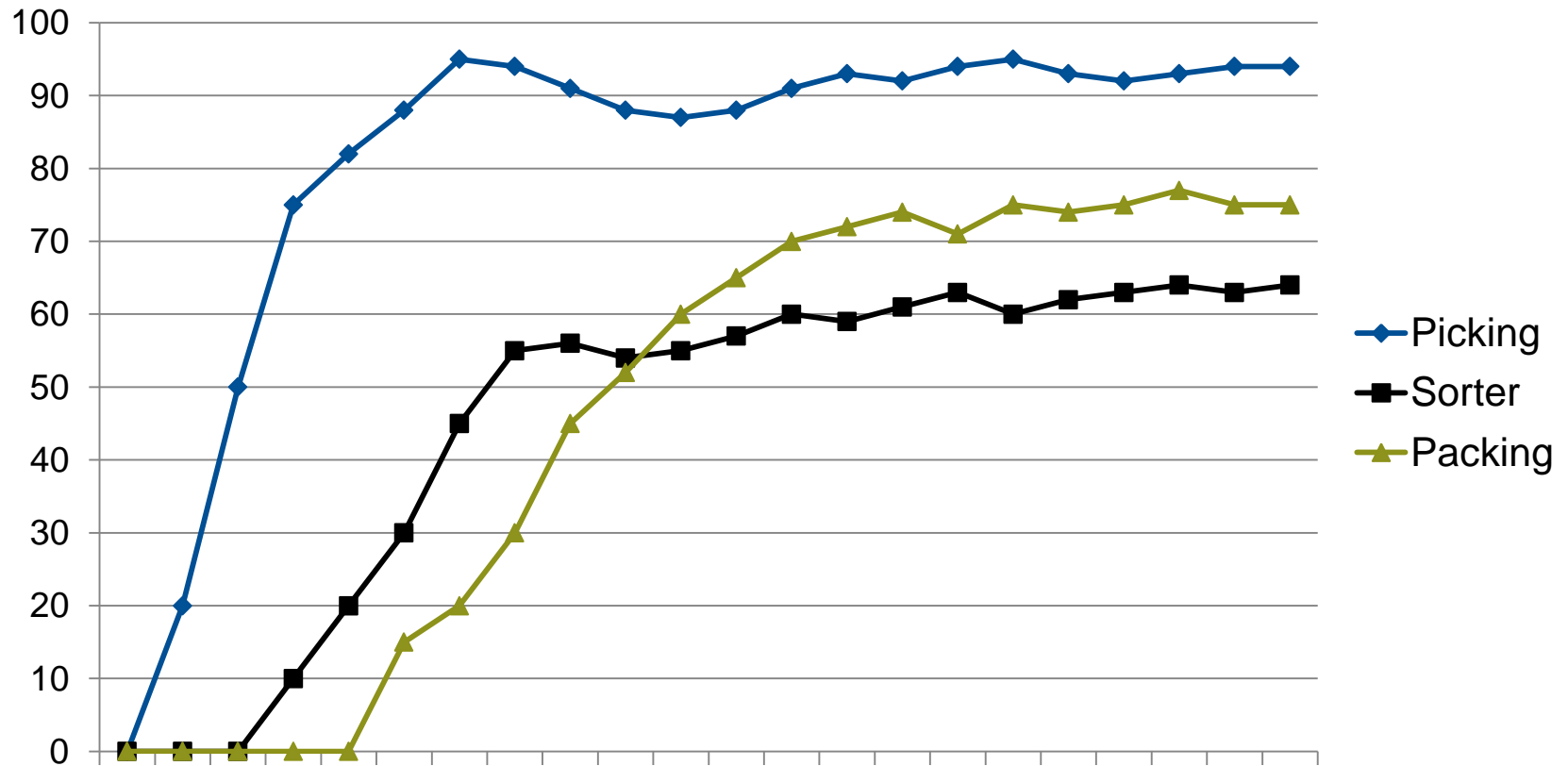


More Consistent Labor Utilization



Order Streaming

More consistent labor utilization



Wave-based Fulfillment

Advantages

- Built on aggregation and builds efficiencies around throughput of the batch
- More efficient batch picking and replenishments reduces labor and equipment costs due to order batching
- Pack waves aim to align with MHE capacity constraints
- Standard wave monitoring capabilities provide high order fulfillment visibility
- Stable and proven
- Integrated Labor, TMS, etc...
- Retail flowthrough

Drawbacks for DTC Fulfillment

- Not optimized for single order throughput
- Limited capabilities to synchronize workload balancing and assignment based on real time attributes of the sorter
- More buffer required/recirculation required to pre-staging pack waves
- Pack waves are executed sequentially
- Labor peaks and valleys between waves



“Waveless”-based Fulfillment

Advantages

- Coordinates and synchronizes the work(pick tasks) with the availability of the sorter (pull model)
- Can help dynamically manage exceptions (i.e., rush orders) ‘on the fly’ vs. getting queued
- Less buffer/recirculation required for MHE fulfillment throughput
- Assembles pick tasks based on MHE capacity
- Smoother labor curves for replenishment picking and packing

Drawbacks for DTC Fulfillment

- Requires sophisticated and costly WCS/WMS integration
- More replenishments may be required to fill forward pick locations
- Non-optimal pick travel paths
- Missed opportunities for opportunistic allocation swap for VIP orders
- Missed cross-dock/opportunistic substitution/flow through opportunities
- Gridlock for multi item orders as chutes get assigned before all line items arrive
- Separate systems lead to:
 - Static task prioritization
 - 2 different execution systems, more training, different screen controls, etc....
 - No task interleaving
 - Can’t start processing until replenishment is complete and inventory made available.



Order Streaming-based Fulfillment

Advantages

- Single code base allows extreme flexibility to determine how much Order Streaming to use vs. traditional wave-based
- Deeper allocation – reserve as well as forward pick locations
- Optimized for single order throughput or small batches
- Coordinates and synchronizes the work (pick tasks) with the availability of the sorter (hybrid push/pull)
- Dynamic Chute Assignment rules
- Smoother labor curves for replenishment picking and packing
- Prioritizes the most important orders at any given time
- Ability to consolidate picks up to and including at time of execution
- Robust task priority bump up capabilities
- Increased sorter utilization

Drawbacks for DTC Fulfillment

- More replenishments may be required to fill forward pick locations (mitigated by task consolidation logic)
- Less batch pick opportunities (mitigated by task consolidation logic)
- Process and mindset shift – but change isn't always bad!
- Not as proven as traditional wave based processing



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