

BEYOND THE WMS

WHY REAL-TIME, AI-DRIVEN
ORCHESTRATION IS THE NEW
BACKBONE OF FULFILLMENT

MARKET CONTEXT: VOLATILITY + AUTOMATION = ORCHESTRATION GAP

Rising SKU counts, omnichannel nodes and fragmented automation are straining static Warehouse Management System (WMS) planning, creating a widening orchestration gap.

SKU counts continue to climb

- ▶ **86%** of leaders expect more SKUs through 2030¹, yet the same inventory pool now serves distribution centers (DCs), microfulfillment sites and retail stores under radically different Service Level Agreements (SLAs).

Robotics is mainstream

- ▶ **93%** of supply-chain leaders have deployed or will deploy their first smart robot within two years, and most will expand to multi-vendor fleets. (Gartner)²

Planning latency is the new bottleneck

A traditional WMS “allocates” work in waves, hours ahead of execution. When reality shifts (labor changes, robot congestion, rush orders), people patch together a new plan manually — costing precious cycle time.

THE MODERN WAREHOUSE STACK

Running an automated warehouse is no longer a single-platform job.

Best-practice sites layer three systems, each owning a distinct time-horizon and level of control:



WMS (Warehouse Management System)

Inventory integrity, order allocation, labor standards, compliance/audit

Batch/Wave

Days → Hours

IT/Supply Chain



WES (Warehouse Execution System)

Device-aware work release, wave/waveless optimization, material-flow monitoring

Continuous

Hours → Minutes

Engineering/Ops



MAOP/RCS (Multiagent Orchestration Platform / Robotics Control System)

Real-time decisioning across all agents – robots, people, conveyance; cross-system traffic management

Real-time

Minutes → Seconds

Ops/Automation Center of Excellence

One layer cannot simply “grow” into the next without compromising performance or compliance. Instead, each system specializes, exposing clean APIs upward and downward.

01

WMS: STILL MISSION-CRITICAL, BUT BUILT FOR STABILITY

The modern WMS emerged in the 1990s to digitize location control, order waving and labor tracking. In structured environments, it continues to deliver:

≥99% inventory accuracy³ and 10–50% labor savings⁴ (typical ROI 12–24 months)

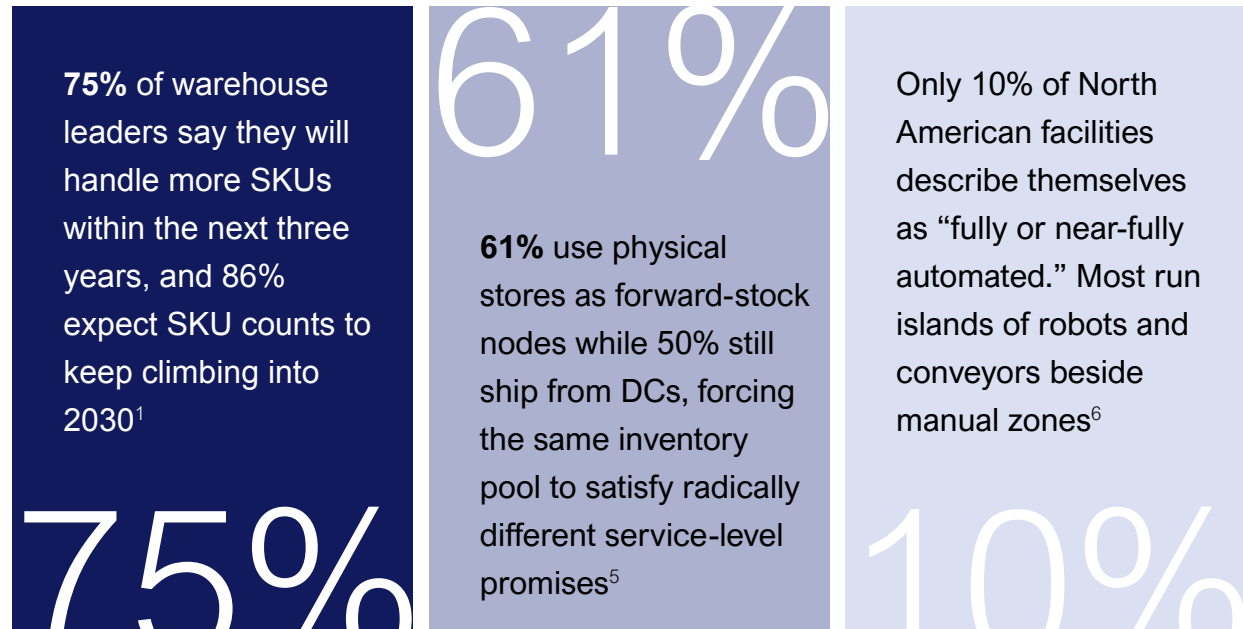
ERP-grade data integrity and audit trails

Proven integrations with upstream ERP systems

Limitation: A WMS “allocates” work hours ahead of execution. When reality diverges in modern warehouse environments — hardware congestion, labor changes, priority shifts — the WMS itself does not recalculate the sequence. Human supervisors improvise, or point solutions fight for priority.

02

WHY STATIC PLANNING BREAKS IN 2025



Every new piece of automation added (a robot fleet, put-wall or sortation loop) creates another decision domain. Without an orchestration layer, those domains optimize locally and sub-optimize globally, with no standardization.

Why not just add more code to the WMS?

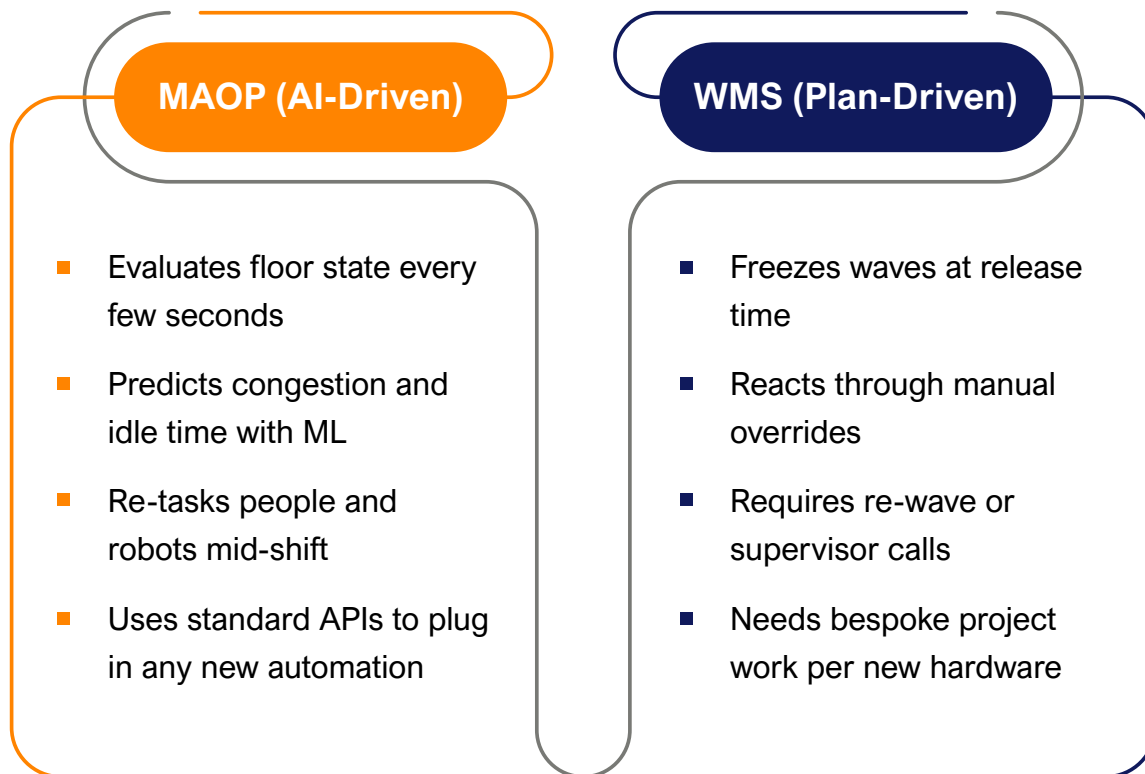
Because a WMS is engineered for record-keeping, not split-second control. The moment you bolt real-time optimization onto a compliance system, every new robot or put-wall forces another custom patch. A purpose-built orchestration layer avoids that retrofit trap and lets the WMS remain the book of record while MAOP becomes the real-time brain.

03

FROM EXECUTION GAP TO MAOP

An MAOP applies real-time data, optimization algorithms and machine-learning policies to rebalance work continuously.

Each robot fleet, shuttle loop or put-wall speaks its own dialect. An MAOP normalizes those streams into a single language, fusing telemetry, labor and order data into one live model. That shared brain delivers unified visibility and cross-system optimization — turning disconnected automation pockets into a continuously coordinated network.



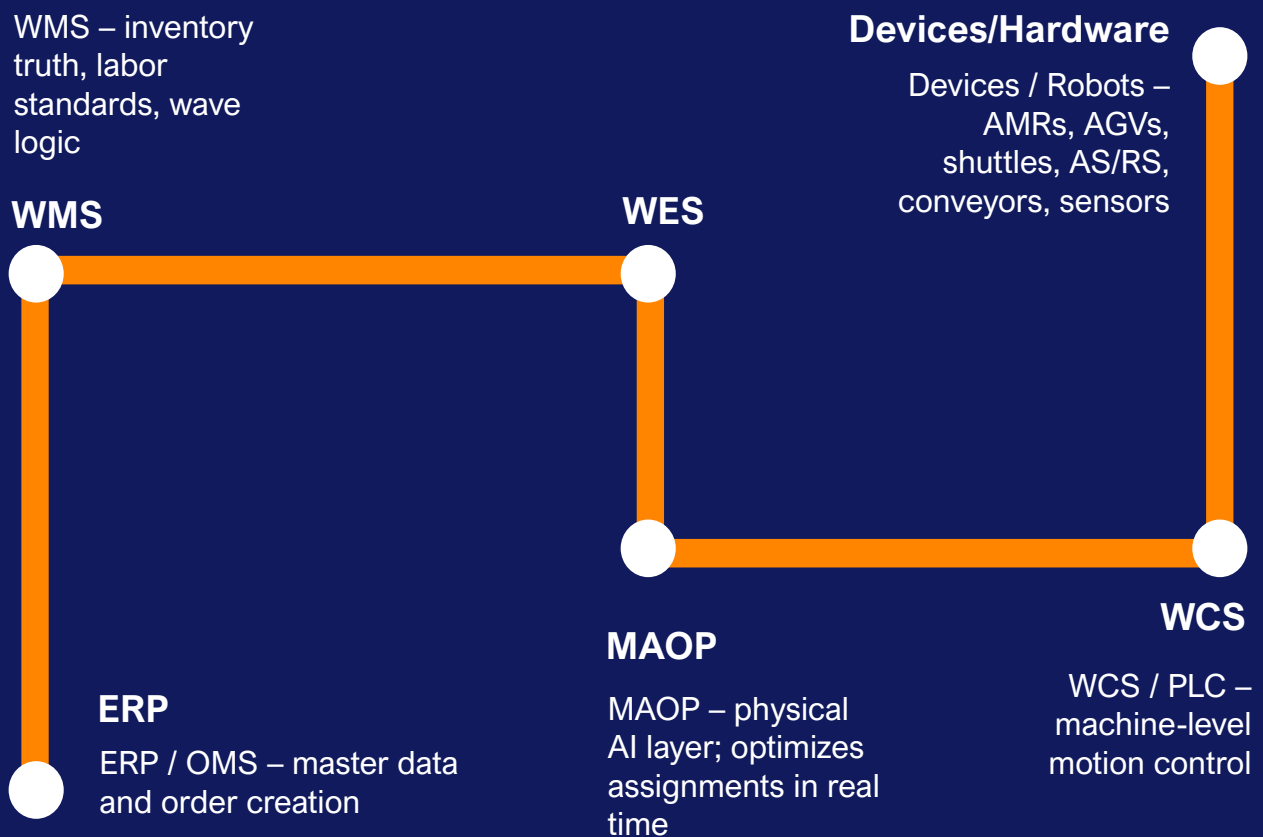
Real-time adaptability is emerging as a key differentiator across WMS-related offerings.

— **Gartner Critical Capabilities, 2025**

04

HOW THE LAYERS FIT

Use this reference architecture while planning:



The WMS remains a system of record for inventory and compliance.

MAOP ingests live signals (robot telemetry, path planning, pick rates, charge status) and issues optimization commands upstream (to WMS) and downstream (to WCS/robots).

The WCS continues to send low-level motion or PLC commands

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WMS V. WES V. MAOP - CLEAR-CUT ROLES

Capability	WMS 53	WES	MAOP
Inventory accuracy	✓ Plans and tracks	✓ Reads WMS stock files	—
Work-wave creation	✓ Batch-based	— (executes what WMS releases)	—
Real-time task rebalancing	—	▲ Robots or people within a device family	✓ AI-driven, cross-zone re-sequencing every few seconds
Multiagent coordination	—	▲ Robots or people within a device family	✓ Humans + multi-fleet robots across all zones
Congestion prediction	—	—	✓ ML forecasts - idle time and bottlenecks
Device-level control (PLC)	—	— (handled by WCS)	— (commands routed via WCS)
Outcome	Stable plan	Adaptive flow (in a work cell)	Network-wide adaptive flow & utilization

Key: ✓ = native strength ▲ = partial / rule-based — = not provided

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AM I READY FOR ORCHESTRATION?

AI / Automation CoE

- Ask ●
 - ✓ Agent diversity?
 - ✓ Scale? (fleet/sites/growth)
 - ✓ OEM roadmap and openness?
- Action ●
 - ✓ ≥ 3 types → run MAOP pilot
 - ✓ >300 /site or $>30\%$ YoY → orchestration required
 - ✓ Prefer open APIs + standards

Ops / SC Excellence

- Ask ●
 - ✓ Nodes and SLAs? (DC, MFC, stores)
 - ✓ Peak volatility?
- Action ●
 - ✓ Frequent reprioritization → global orchestration
 - ✓ $>2x$ variance → dynamic rebalancing pilot

IT / Enterprise Arch

- Ask ●
 - ✓ Event bus ready?
 - ✓ API posture?
- Action ●
 - ✓ No $<1s$ telemetry → build bus first
 - ✓ If bespoke, run connectivity sprint pre-MAOP

Finance / Value Office

- Ask ●
 - ✓ KPIs and stage-gates?
- Action ●
 - ✓ Fund by KPI thresholds (aim <18 -mo payback)

07

CONCLUSION

Static planning can't keep pace with next-hour SLAs.

When demand, labor and automation shift by the minute, only AI-driven orchestration — Physical AI — can turn fragmented assets into a single, self-optimizing network.

Start with an honest audit. Use the checklist in section 6 to score decision latency, data readiness and agent diversity. If three or more gaps surface, it's time to pilot an MAOP.

Reach out to GreyOrange to learn more about MAOP and the impact it could have on your warehouse operations.

Source:

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3. The ROI of WMS: supercharge your peak season <https://deposco.com/blog/understanding-the-roi-of-warehouse-management-to-supercharge-your-peak-season/?utm>
4. A TIMELINE OF WMS EFFICIENCY IMPROVEMENTS AND ROI ON YOUR INVESTMENT <https://www.scjunction.com/blog/wms-efficiency-improvement-supply-chain?utm>
5. Retail TouchPoints; Design:Retail. Omnichannel & Fulfillment Benchmark Survey 2024. Retail TouchPoints / Design:Retail, December 2024, d5544430a84c15063ea9-24a29c251add4cb0f3d45e39c18c202f.ssl.cf1.rackcdn.com/RTP_RT448_SURV_Omnichannel_Fulfillment_December_2024_Final.pdf.
6. Hai Robotics; Peerless Media Research. 2024 Warehouse Automation & Order Fulfillment Study. Hai Robotics & Peerless Media, 2025, www.peerlessresearch.com/wp-content/uploads/2025/05/Hai-Robotics-Research-Brief.pdf?utm