



Revolutionizing warehouse efficiency

How IMI & CQM combine AI and optimization in the
Pick Order Build module

Co-authored by IMI and CQM

Executive summary

In today's fast-paced supply chain landscape, operational efficiency and adaptability are critical for enterprise warehouses. Faced with rising order volumes, tighter fulfilment windows, and labour shortages, traditional Warehouse Management Systems (WMS) struggle to keep up.

To address this, IMI - in strategic partnership with CQM - introduces the Pick Order Build+ (POB+) module, a next-generation optimization engine that leverages advanced algorithms and AI to transform warehouse operations.

The result? Consistently higher picking efficiency, faster fulfilment, and scalable performance. All without disrupting your existing WMS environment.

Challenges in modern WMS environments

Modern warehouses are becoming increasingly complex. In this section, we outline the key challenges that POB+ is designed to solve.

Warehouses are facing high order volumes, a growing number of SKUs, rising expectations for fast and accurate fulfilment, labour shortages, and escalating operational costs. On top of that, there's a strong need for flexible and scalable solutions that integrate seamlessly with existing WMS platforms.

Traditional picking strategies often fall short; they lead to inefficient travel routes, congestion, and poor use of resources. These issues directly affect throughput, cost-efficiency, and ultimately, customer satisfaction.

Introducing the next-generation Pick Order Build: POB+

Pick Order Build+ (POB+) is a high-efficiency algorithmic module, developed by CQM and delivered by IMI as an add-on to your WMS. It is designed to optimize the creation of pick orders, minimizing travel time and maximizing throughput. Regardless of warehouse size or complexity.

Key capabilities

POB+ is built on a set of core capabilities designed to maximize warehouse efficiency.

Smart Optimization

POB+ calculates holistic pick routes to minimize total picking time. This includes travel distance, number of stops, drop-off points, and waiting times, ensuring efficient execution across the warehouse.

Congestion Avoidance

POB+ takes into account aisle entry and exit points, travel direction and transfer points to ensure intelligent routing and maintain smooth traffic flow and reduce delays caused by congestion.

Advanced Constraint Handling

The engine respects complex business rules, enabling tailored pick strategies. These constraints include order combinations, load carrier types, customer-specific separation, time-based priorities, and departure times.

Scalable Performance

Designed for high-volume execution, POB+ supports large-scale operations with minimal latency, ensuring consistent and reliable performance even under peak loads.

Seamless Integration

Delivered as an add-on component with out-of-the-box integration to IMI WMS, reducing implementation time and complexity.

Digital Twin (DT) Support

POB+ allows simulation and validation of pick strategies before deployment. This reduces operational risk and improves accuracy by identifying potential issues early.

Reliable Output & Quality Assurance

Built-in error detection and extensive exception reporting ensure only high-quality pick orders are generated. Problematic input data is flagged early, allowing for correction or fallback before it can impact operations.

POB+ is engineered for speed and scalability.

The figures below demonstrate how the module performs in high-volume environments:

- Generates pick orders for 1,000 Pick Load Carriers (PLCs) in under one minute.
- Supports up to 3,000 PLCs per API call.
- When applicable, PLC groups are processed in parallel to ensure consistent speed during peak loads.
- Robust exception reporting and fallback logic to handle incomplete or invalid data.

What you gain: measurable impact

POB+ drives clear operational benefits. On picking distance alone, we see an improvement of typically 10-30% which results in an increase of overall productivity of 3-10%. As a result, you'll see lower labour costs per order and higher order throughput without needing to expand resources. Finally, there is improved fulfilment reliability and customer satisfaction.

Picking efficiency typically improves between
3–10%

Digital Twin

The Digital Twin is a virtual replica of the POB+ process, developed to simulate and evaluate performance in a controlled, data-driven environment. It enables side-by-side comparison of the new POB+ algorithm and the current picking approach. By reconstructing the existing logic within the Digital Twin, we ensure a fair, accurate evaluation.

The Digital Twin can be used upfront to calculate expected benefits.

The screenshots to the right offer a preview of the operational insights it provides.



Customer impact & use cases

POB+ is relevant across multiple warehouse types. These examples illustrate how different sectors can benefit from its capabilities.

- Retail and wholesale distribution centers: Reduce picker travel time, increase order throughput, and adapt to seasonal peaks.
- 3PL providers: Optimize multi-customer, multi-priority picking with complex constraints.
- E-commerce fulfilment: Accelerate order processing and minimize errors in high-SKU environments.

About the strategic partnership: IMI & CQM

Since 2025, IMI and CQM have joined forces to tackle the growing complexity in warehouse operations. IMI brings decades of experience in Warehouse Management Systems; CQM adds deep expertise in mathematical modelling, AI, and logistics optimization.

What makes this partnership unique is CQM's ability to combine advanced algorithm development with a deep understanding of real-world warehouse processes. This ensures that Pick Order Build+ is not just technically impressive, but also practical, scalable, and easy to implement within existing environments.

Together, we deliver solutions that are intelligent, easy to implement, and immediately valuable.

"At CQM, we bridge the gap between complex logic and practical outcomes. Pick Order Build+ is a clear example of how smart algorithms drive measurable warehouse performance."



- Ir. Monique van den Broek, Partner and Senior Principal Consultant at CQM.

"Integrating cutting-edge AI into our proven WMS solutions with CQM allows us to elevate warehouse management to a new level."



- Niklas Rönnbäck, CEO at IMI.



Ready to unlock the potential of your warehouse?

Join our webinar: Discover how POB+ can transform your warehouse.

On 4 December at 08:30 CET, CQM and IMI will host a live webinar where we dive deep into Pick Order Build+ (POB+); our next-generation module for warehouse optimization.

In just 30 minutes, you'll gain insight into:

- The most common warehouse challenges and how POB+ addresses them.
- Key features of the POB+ module and how it integrates with IMI's WMS.
- The power of Digital Twin simulation to test and improve pick strategies.
- A real-world customer case, including setup, results, and business impact.
- Your opportunity to ask questions directly to our experts.

Join us and find out how POB+ delivers measurable impact. Fast.

[Register now!](#)

Factsheet-appendix

Functional overview

Inputs:

- Aisle waypoints and directions.
- Transfer points and pick zones.
- Load carriers and pick lines.
- Standard normtime parameters.
- Fixed pick order sequence.

Outputs:

- Optimized pick orders.
- Exception handling for special cases.

Optimization logic:

- Holistic minimization of total time spent (travel, stops, locations, drop-off points).
- Congestion avoidance (smart routing, entry/exit management).
- Constraint handling (order combinations, customer separation, load carrier types, priorities, departure times).
- WMS-enforced separation when required.

Technical overview

Design principles

The Pick Order Build+ (POB+) algorithm is built on advanced mathematical optimization and AI, focusing on holistic minimization of total picking time.

The design leverages:

- Graph-based warehouse modelling for accurate route calculation.
- Constraint-based logic to handle complex business rules (e.g., order combinations, load carrier types, priorities).
- Modular architecture for easy adaptation to different warehouse layouts and processes.

Enabling quick response: Parallel processing

POB+ is engineered for high throughput and low latency:

- Parallel processing: The algorithm can process multiple Pick Load Carrier (PLC).

groups simultaneously, distributing computational load across available CPU cores.

- Scalability: Supports up to 3,000 PLCs per API call, with response times under one minute for 1,000 PLCs.
- Batching and smart grouping: Ensures optimal use of system resources and consistent performance even during peak loads.

Error handling & exception management

Robust error handling is built in:

- Input validation: All incoming data (waypoints, pick lines, etc.) is validated for completeness and correctness.
- Exception reporting: The API returns detailed exception messages for any orders or PLCs that cannot be optimized, allowing for manual review or automated fallback.
- Resilience: The system is designed to continue processing unaffected groups even if some data is invalid or incomplete.

Factsheet-appendix

Integration technology

POB+ is delivered as a modern, cloud-ready component:

- Standardized endpoints for easy integration with IMI WMS.
- Docker image: Enables rapid deployment in on-premise or cloud environments.
- Digital Twin support: Enables simulation and validation of pick strategies before live deployment.

Environmental Requirements

System requirements:

- To be determined based on deployment scenario.
- Recommended CPU: multi-core for parallel processing.
- Compatible with standard IMI WMS infrastructure.

