Grid Dynamics
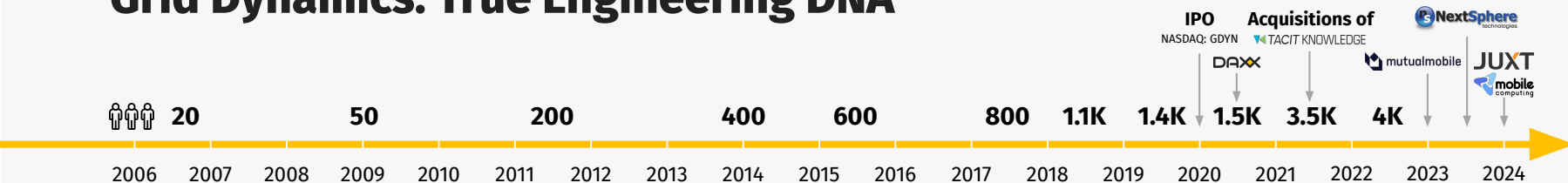
Trusted engineering partner for digital transformation

Smarter supply: Streamlining the automotive aftermarket with AI

April 2025

Grid Dynamics: True Engineering DNA

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
20			50			200			400		600		800	1.1K	1.4K	1.5K	3.5K	4K	

Our Story

Founded in the Bay Area by Victoria Livschitz to enable cloud computing for enterprises. As commerce shifted online/mobile our enterprises customers needed robust solutions for finance, supply chain, manufacturing and digital experiences.

A pedigree in data & ML and strong R&D culture means we are expert implementers of AI technologies. With over 15 years of transformational ML/AI programs successfully delivered – we are trusted by complex, regulated and distributed corporations as their data & AI partner.

19 Countries	**49%** Senior engineering personnel
10+ Top university partners	**4500+** Engineers

Google   JABIL   exabeam   PEPSICO   ★macy's   RAYMOND JAMES   AMERICAN EAGLE   MERCK

The Challenge

Mechanic

Information gap

I need a part for a vehicle on my ramp. I need to ensure I get the right product quickly and at the best price.

I will probably place multiple orders if I have uncertainty on product fit and availability and so some orders will have to be returned.
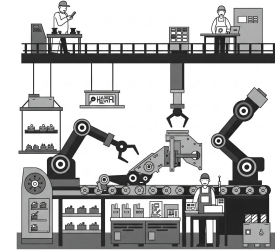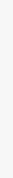
Distributor

Information gap

I want to deliver to the customers quickly but also be efficient.

I need to accurately to manage inventory and resource levels to minimise dead stock.

I need good quality data to drive purchase confidence.

Supplier

I need data from the distributors to forecast demand for supply management.

I need to support distributors with product data.

Grid Dynamics / Smarter supply

The Solutions

Mechanic

- → Intelligent product discovery
- → Delivery date guarantees
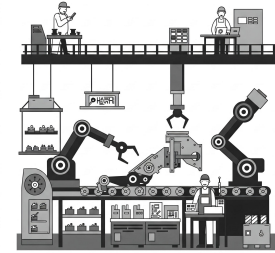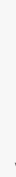- → Order cancellation windows

Information gap

Distributor

- → Inventory allocation
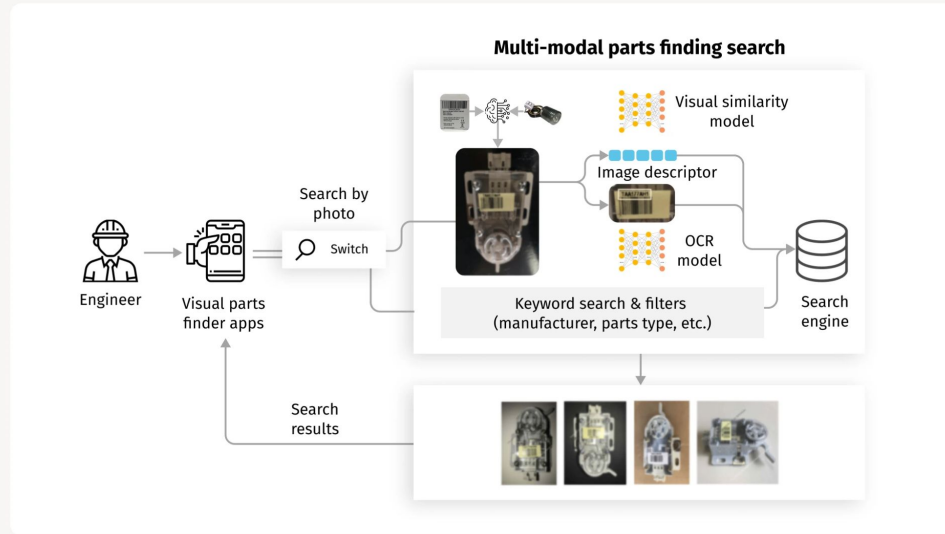- → Picking optimisation
- → Demand sensing

Information gap

Supplier

- → Product data management
- → Demand forecasting

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Faster, more accurate product discovery

Smart product search enables customers to find the right product quickly and high data quality reduces ambiguity about product fit.

➜ **Solution:** Visual search + OCR + intelligent keyword search = perfect hit

Multi-modal parts finding search

Engineer → Visual parts finder apps → Search by photo → Switch → Image descriptor → Visual similarity model / OCR model → Keyword search & filters (manufacturer, parts type, etc.) → Search engine → Search results

Product data for improved product discovery

Rich product data underpins good quality search. Manufacturers need to support distributors with good quality data.

→ **Solution:** Use AI to label product information at scale to reduce data capture overheads.
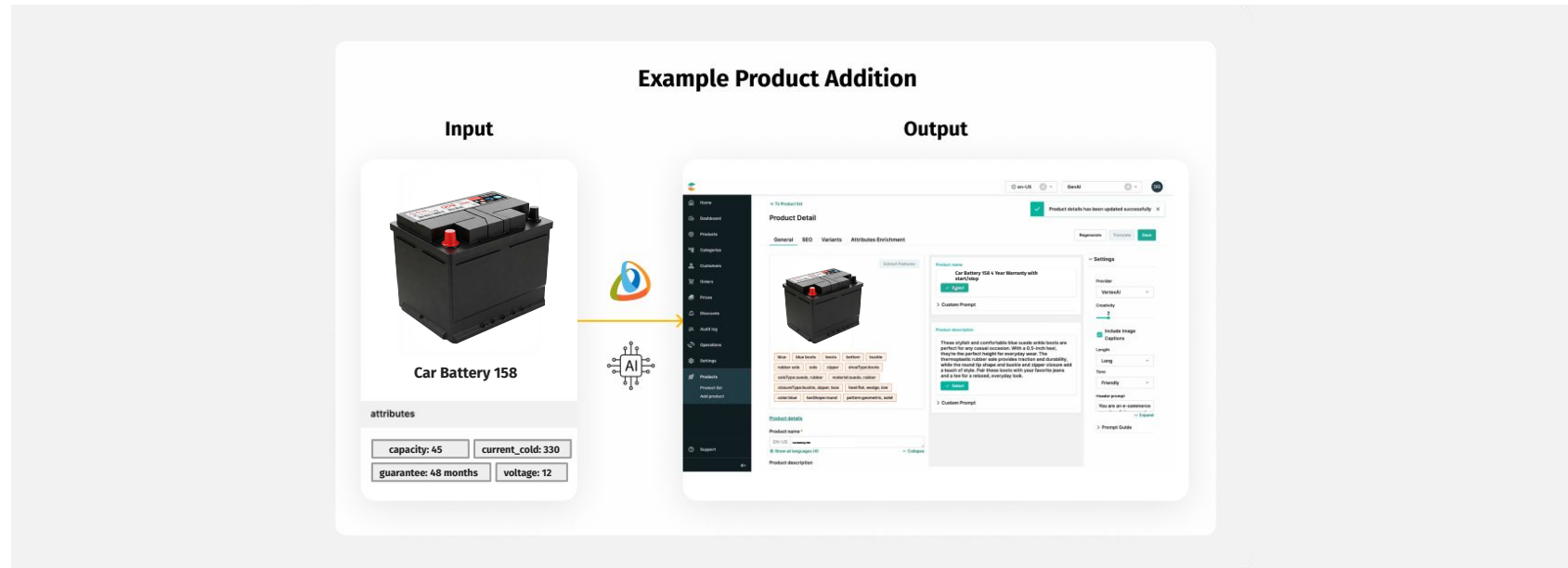
Delivery date guarantees for purchase confidence

Improve customers trust the part will arrive on time with delivery data guarantees.

➜ **Solution:** Machine Learning with process logging and a rules engine can enable an accurate estimated delivery date service that can be surfaced to customers at relevant points in their journey.

High-level technical architecture

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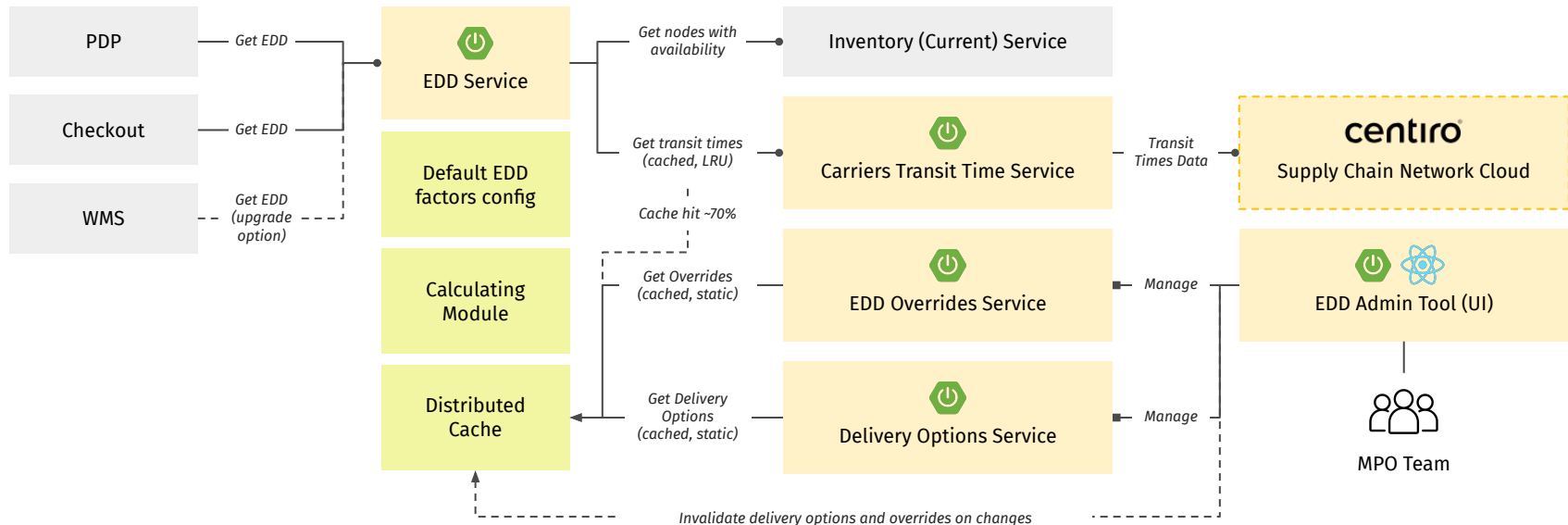
Order cancellation windows to minimise unwanted deliveries

Extended order cancellation windows can help minimise unwanted deliveries.
Has a downstream effect on fulfilment.

→ **Solution:** Couple with dynamic rerouting so orders can be cancelled and remain on the van for simpler returns and reduced unnecessary trips.
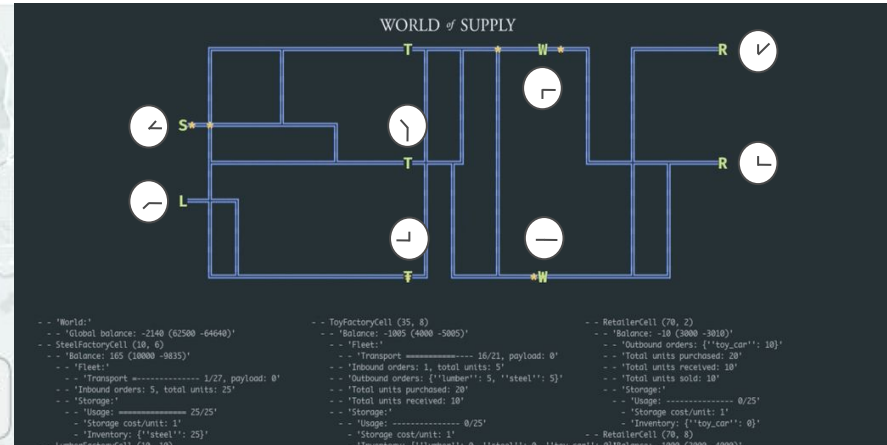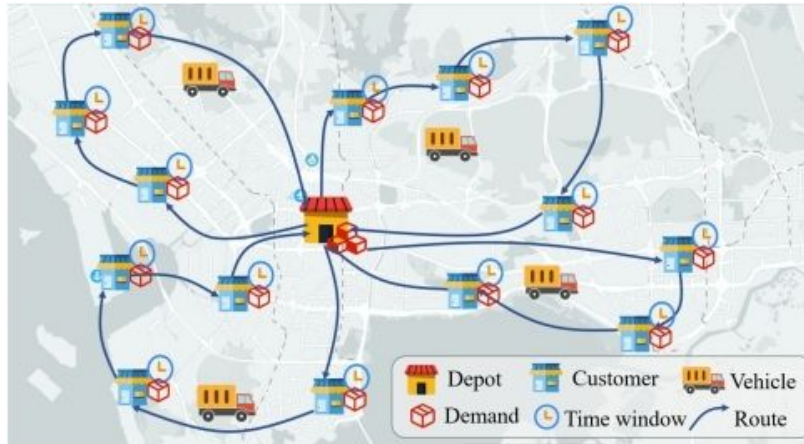
MAP: Zefang Zong, Xia Tong, Meng Zheng, and Yong Li. 2024. Reinforcement Learning for Solving Multiple Vehicle Routing Problem with Time Window. ACM Trans. Intell. Syst. Technol. 15, 2, Article 32 (April 2024)
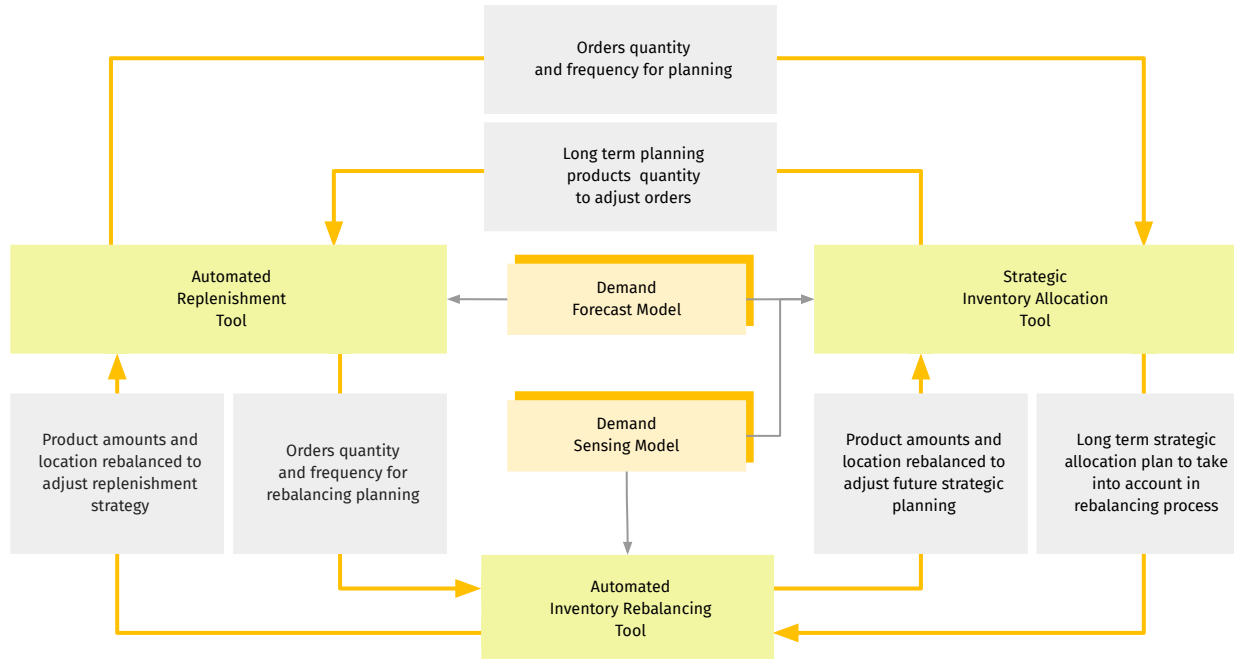ANIMATION: World-Of-Supply, Ilya Katsov, https://github.com/ikatsov/tensor-house/tree/master/supply-chain/world_of_supply

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Smart control tower: inventory optimization

Effective inventory management ensures maximum stock availability, and enables strategic inventory allocation.

→ **Solution:** A control tower combining three major automation tools that complement and adjust each other.

Orders quantity and frequency for planning		
Long term planning products quantity to adjust orders		

Automated Replenishment Tool

Demand Forecast Model

Strategic Inventory Allocation Tool

Product amounts and location rebalanced to adjust replenishment strategy

Orders quantity and frequency for rebalancing planning

Demand Sensing Model

Product amounts and location rebalanced to adjust future strategic planning

Long term strategic allocation plan to take into account in rebalancing process

Automated Inventory Rebalancing Tool

Inventory Allocation Optimization Demo
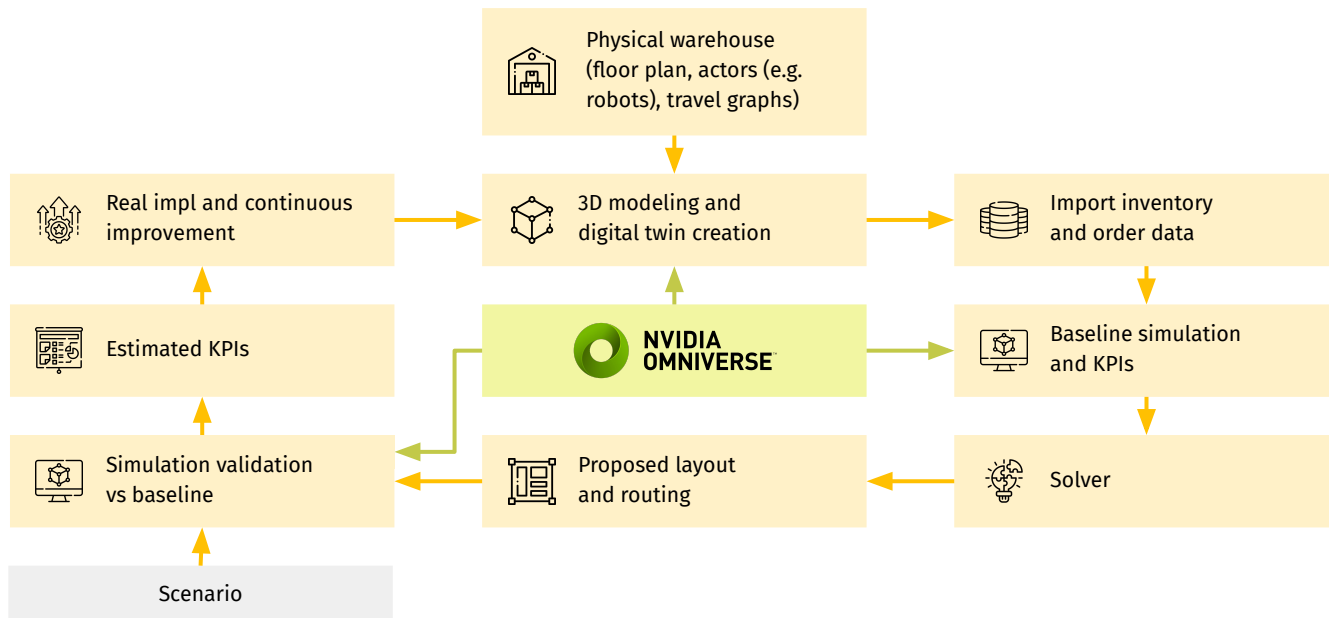
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Reduce order picking time for faster turnaround

-25%
Order picking time

Shorter delivery windows mean more responsive supply but this needs faster picking.

→ **Solution:** Digital twin = solver + simulator to drive order picking optimization for faster turnaround of orders.
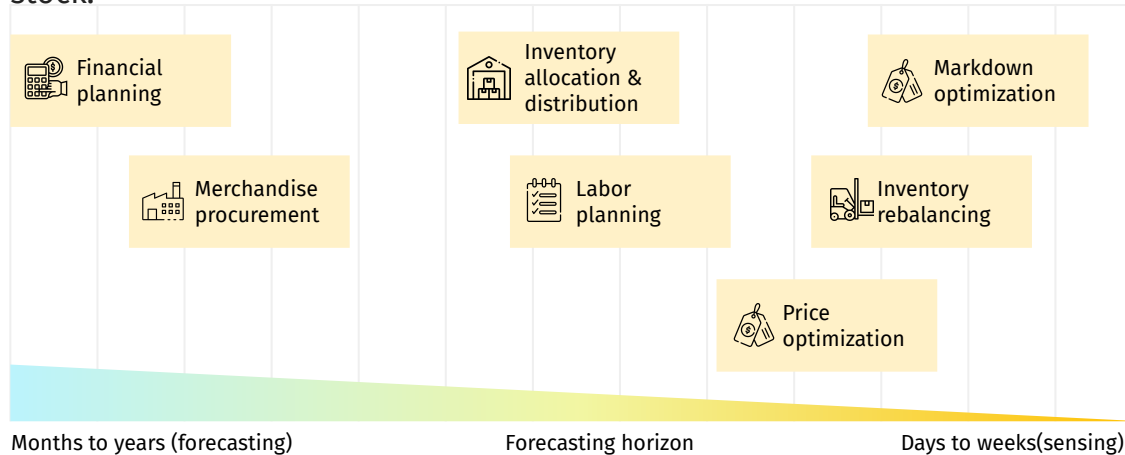

Physical warehouse (floor plan, actors (e.g. robots), travel graphs)

Real impl and continuous improvement

3D modeling and digital twin creation

Import inventory and order data

Estimated KPIs

NVIDIA OMNIVERSE

Baseline simulation and KPIs

Simulation validation vs baseline

Proposed layout and routing

Solver

Scenario

Save 25% on order picking time

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Demand sensing for pricing and availability management

Pricing is a key component of the purchasing decision as well as stock availability.

➔ **Solution:** Use demand sensing combined with demand forecasting to optimise prices and shift slow moving stock.

Financial planning		Inventory allocation & distribution		Markdown optimization
	Merchandise procurement	Labor planning		Inventory rebalancing
			Price optimization	

Months to years (forecasting) | Forecasting horizon | Days to weeks(sensing)

1.5 B	**-40%**	**30%**
Channel x SKU combinations supported	Stockout and liquidation losses for new and slow moving products	WMAPE accuracy for 52-weeks forecasts

Demand sensing and forecasting

The Solutions

Mechanic

→ Intelligent product discovery

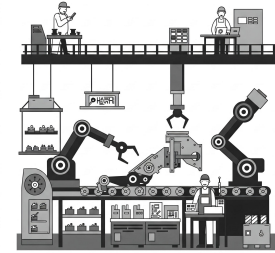→ Delivery date guarantees
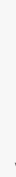
→ Order cancellation windows

Information gap

Distributor

→ Inventory allocation

→ Picking optimisation

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Information gap

Supplier

→ Product data management

→ Demand forecasting

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Find out more

Rhiannon Hanger
EMEA Data & AI Lead

Berthold Puchta
VP of Europe

Jean-Paul de Vooght
Principal Architect

Free strategy session

What challenges are you facing in streamlining your supply chain? Whether it's improving product discovery, managing returns more effectively, or forecasting demand accurately, we'd love to hear from you.

Q&A

Grid Dynamics
PREPARE TO GROW

Thank you for your attention!

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