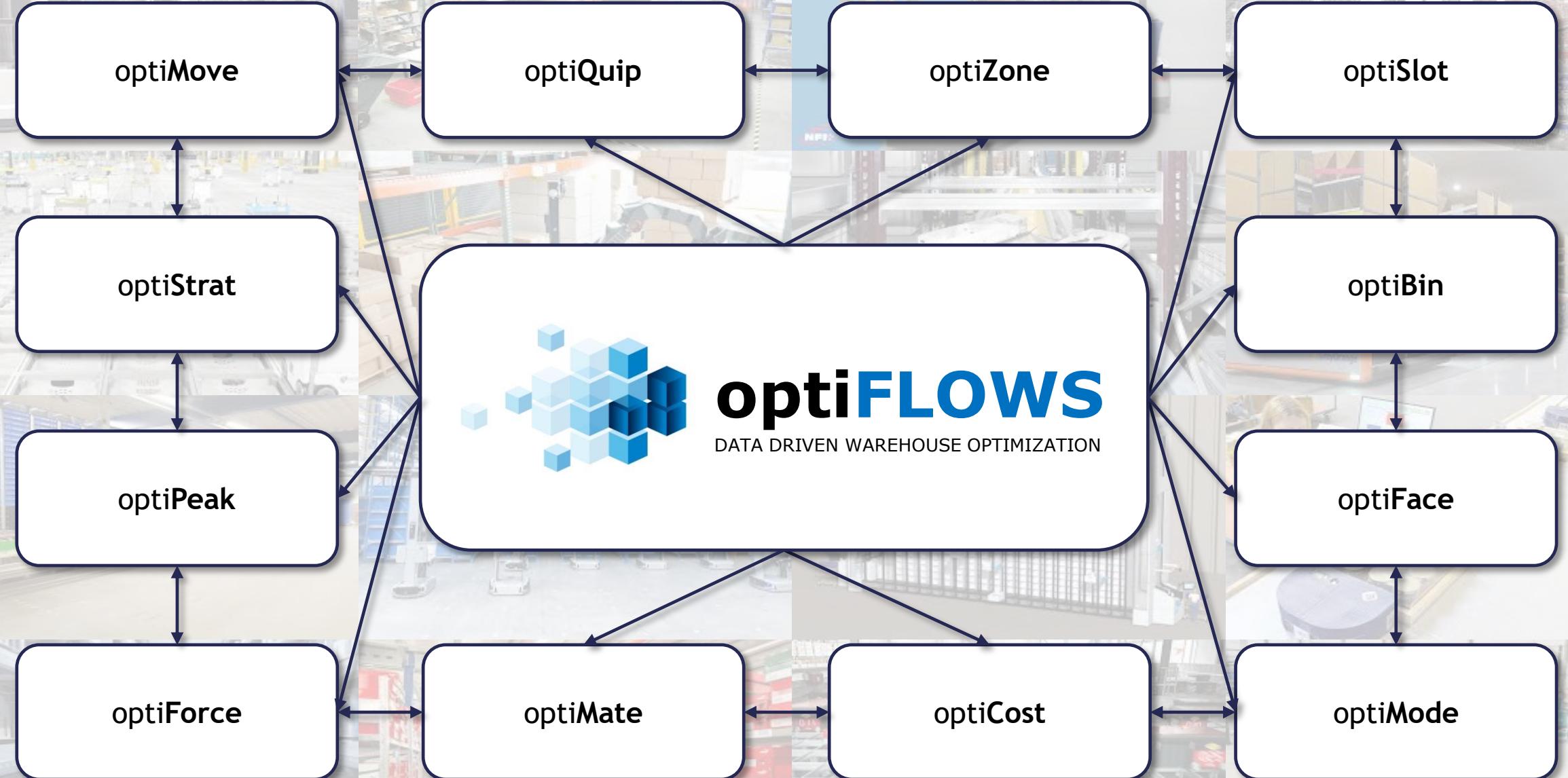


# Warehouse Optimization Optimal Warehouse Design as a Service

Storage Optimization | Picking Optimization | Slotting Optimization | Layout Optimization



**optiFLOWS**  
DATA DRIVEN WAREHOUSE OPTIMIZATION

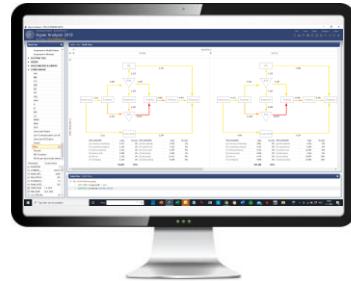


# Kenmerken van optiFLOWS

- ▶ **All-in one softwaretool** voor analyse, modellering, ontwerp en simulatie, bestaat uit 12 modules die het gehele ontwerpkader afdekken
- ▶ **Optimalisatie van bestaande operaties en van (re-)design projecten**, of het nu gaat om e-commerce, groothandel, retail, productie of logistieke dienstverleners, de kern is en blijft de warehousing operatie
- ▶ **Focus op met name geautomatiseerde/gerobotiseerde (G2P) operaties**, maar evengoed te gebruiken voor conventionele (P2G) magazijnen en manuele pickoperaties (al dan niet ondersteund met AMR-robots)
- ▶ **Ongeëvenaard in snelheid, detallering en compleetheid**, ideaal voor workshops, want toegankelijk en begrijpelijk en benaderbaar
- ▶ **Input data uit uw WMS/ERP**, transacties (verkooporders en inkooporders), artikeldata (dimensies, productgroepen e.d.) en tot slot voorraaddata, deze kunnen al snel miljoenen regels bevatten, graag zelfs
- ▶ **Gebruik van visualisaties in de vorm van grafieken, heatmaps, layouts** om resultaten begrijpelijk, inzichtelijk en toegankelijk te maken, maar natuurlijk ook overzichtelijke tabellen
- ▶ **Repetitief van karakter**, of te wel eenvoudig om (half-)jaarlijks opnieuw dezelfde analyses, modellering en simulaties te draaien met zeg maar één druk op de knop
- ▶ **“The devil is in the details”**, derhalve werken we het liefst met ruwe, ongepolijste en onbewerkte data, hierover heen laden we onze “saus”, matchen velden en verrijken deze data waar nodig om klantspecifiek te specificeren en te detailleren

# De 12 modules binnen optiFLOWS

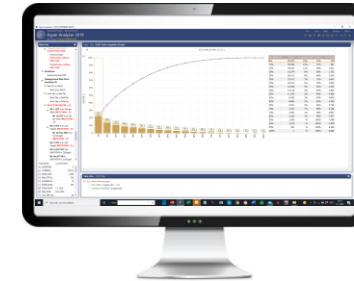
- ▶ **optiMove:** Waar moeten welke processen worden uitgevoerd?
- ▶ **optiQuip:** Welke typen trucks en AMR's zijn het meest geschikt en hoeveel?
- ▶ **optiZone:** Welke artikelen moeten worden gecombineerd in zones voor efficiënte pickruns?
- ▶ **optiSlot:** Waar in het magazijn dient ieder artikel één of meerdere pickposities te krijgen?
- ▶ **optiStrat:** Wat zijn de beste strategieën voor pick/pack en put?
- ▶ **OptiPeak:** Welke capaciteit is vereist om piek volumes aan te kunnen in het warehouse?
- ▶ **optiBin:** Welke (combinatie) van typen bins en aantallen minimaliseert ruimte?
- ▶ **optiFace:** Hoeveel ruimte is idealiter vereist per pickpositie?
- ▶ **optiForce:** Hoe kan de inzet en productiviteit van operators worden geoptimaliseerd?
- ▶ **optiMate:** Welke (deel)oplossingen voor automatisering en/of robotisering verhogen prestaties?
- ▶ **optiCost:** Wat is het kostenniveau om tot verbeterde prestaties te komen?
- ▶ **optiMode:** Welk opslagsysteem is het beste per artikel?



**optiMove**  
Material Flow  
Optimization



**optiQuip**  
Handling Equipment  
Optimization



**optiZone**  
Warehouse Zoning  
Optimization



**optiSlot**  
SKU Slotting  
Optimization



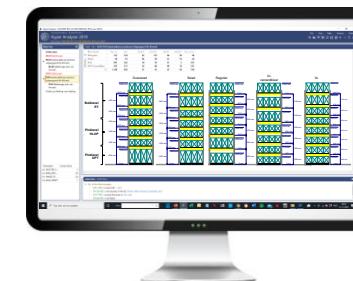
**optiStrat**  
Pick/Pack/Put Strategy  
Optimization



**optiPeak**  
Peak Capacity  
Optimization



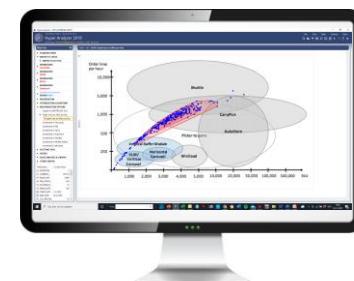
**optiBin**  
Bin Type  
Optimization



**optiFace**  
Pick Face  
Optimization



**optiForce**  
Work Force  
Optimization



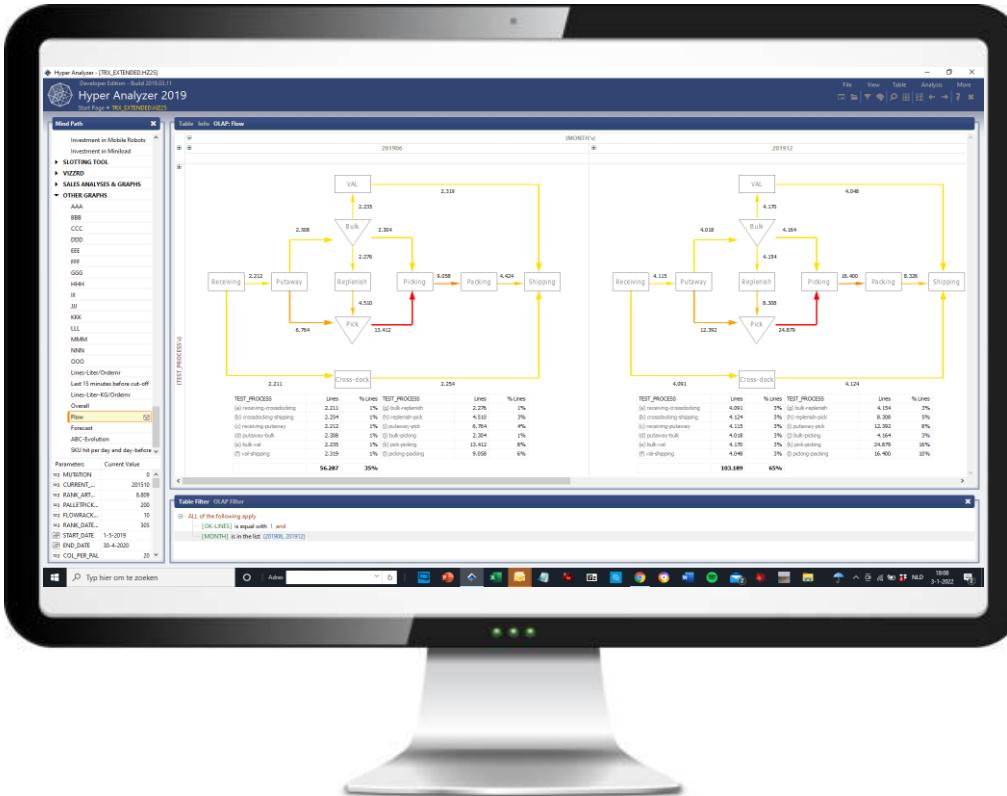
**optiMate**  
Automated/Robotized System  
Optimization



**optiCost**  
Cost Effectiveness  
Optimization



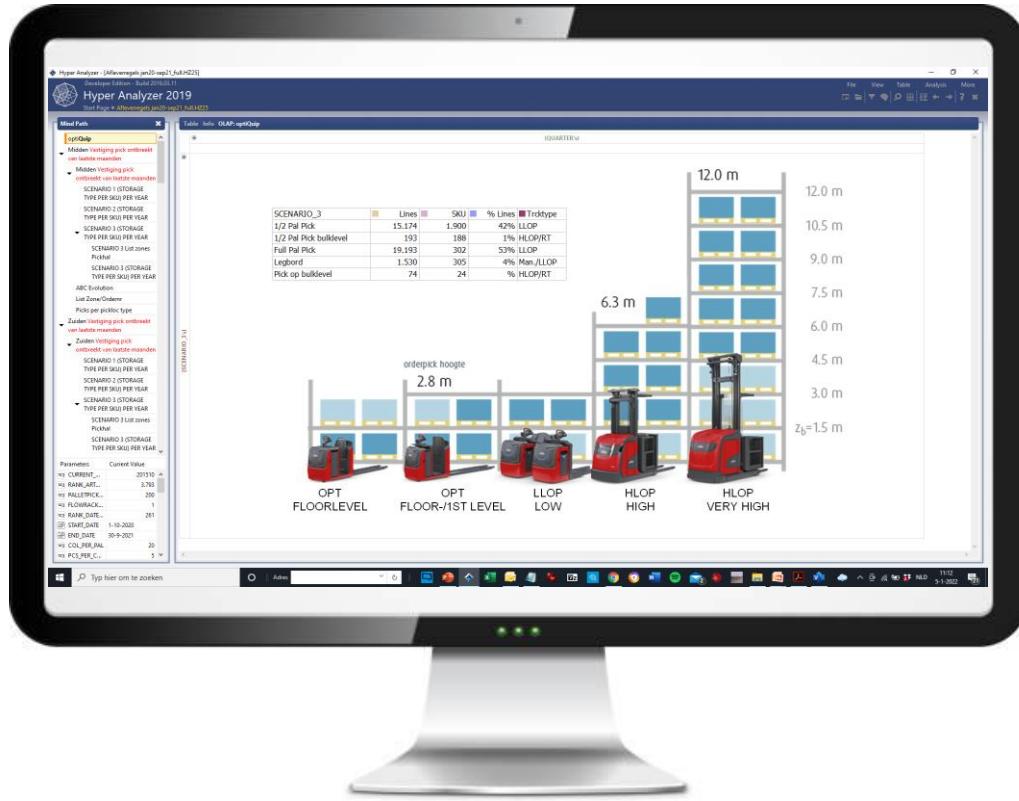
**optiMode**  
Storage Mode  
Optimization



# optiMove Material Flow Optimization

## Questions:

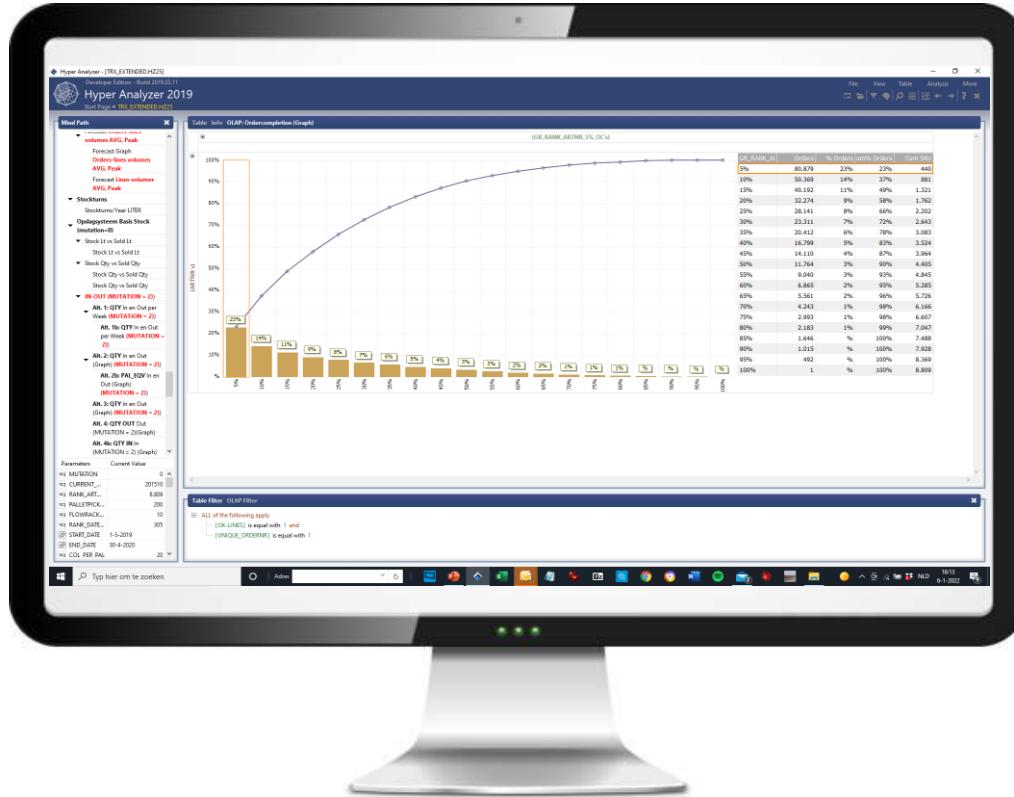
- ▶ Which activities should be adjacent to one another?
  - ▶ What is the best shape for our material flow (U, I, L)?
  - ▶ What is the optimal size for our warehouse?
  - ▶ How can we best set up a one-touch flow (minimal order consolidation)?
  - ▶ In case we need order consolidation, how should this be set up (tote hotel, pigeon holes, estafette picking)?
  - ▶ In case we want to pick directly in customer carton boxes, where to locate erectors, cushioning and closing devices?



## optiQuip Handling Equipment Optimization

### Questions:

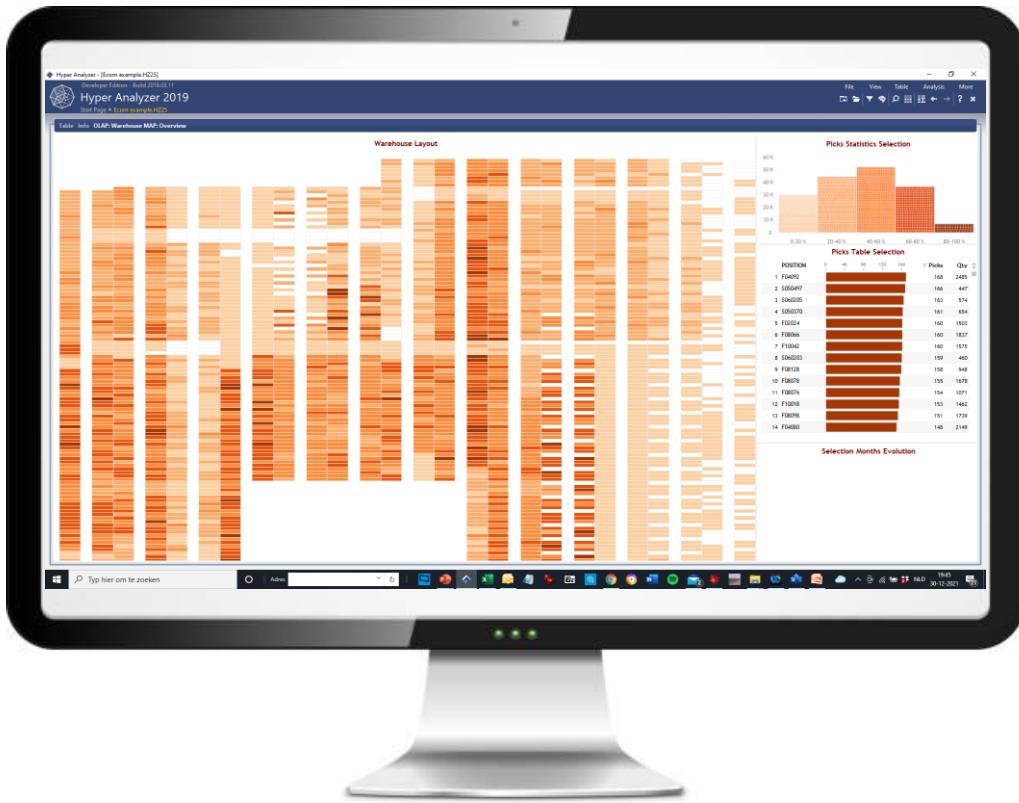
- ▶ Do we need wide aisles (RT), narrow aisles (VNA) or a mix?
- ▶ What percentage of orders and lines are we able to pick from floorlevel, from 1st level (max. picklelevel at 2,8m) and from higher levels (using high level orderpickers)?
- ▶ How to minimize equipment variety and maximize handling productivity?
- ▶ At what point does it make sense for us to (semi-) automate specific processes?



## optiZone Warehouse Zoning Optimization

### Questions:

- ▶ Are there many orders that consist of specific SKUs (f.e. productfamilies or fastmovers), in order to create a warehouse-in-a-warehouse?
- ▶ Is it wise to create separate zones for piece pick and carton pick or should these be integrated into one zone?
- ▶ How should zones be positioned in our warehouse, in order to minimize consolidation, waiting times, lead times and travel distances?
- ▶ Is the creation of fastpick lanes a cost-efficient and valid option?

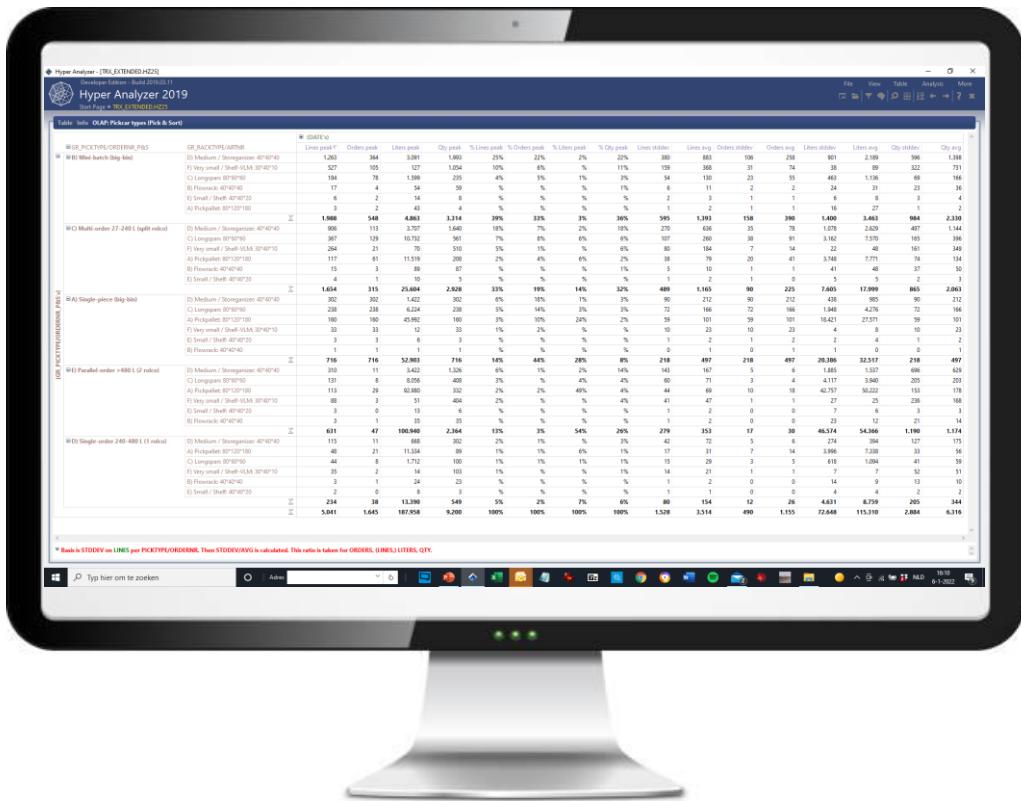


## optiSlot

### SKU Slotting Optimization

#### Questions:

- ▶ What is the optimal storage mode for each SKU, where should each SKU be located in order to minimize picking, error, and space costs?
- ▶ Are current SKUs slotted at the right place in our warehouse to support efficient putaway, picking, and pallet building?
- ▶ Do we need to separate fastmovers from slowmovers, or is it wise to locate these randomly?
- ▶ Is dynamic or static allocation of SKUs preferred and what is the effect on required amount of locations?

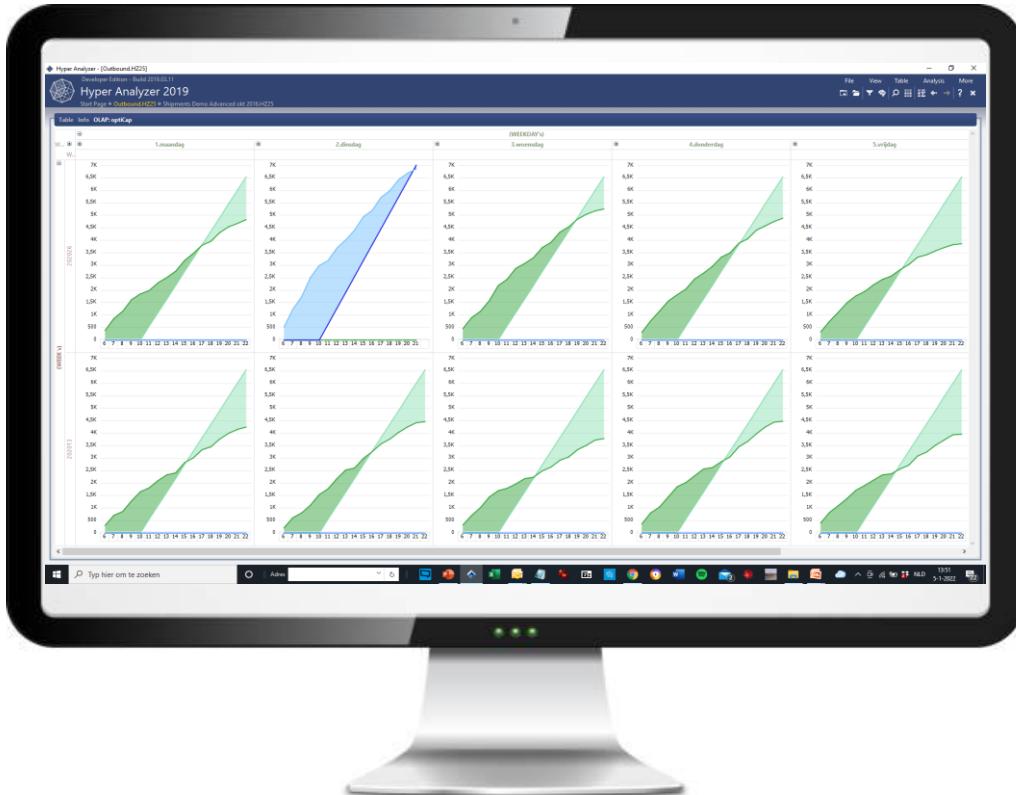


## optiStrat

### Pick/Pack/Put Strategy Optimization

## Questions:

- ▶ Which pick strategies suit best our order profiles (zone-, batch-, single piece-, multi-orderpicking etc.)?
- ▶ Is it possible to pick directly in customer carton boxes or does the overall system require picking in bins/totes?
- ▶ In case large(r) products dictate our operation, is batchpicking the optimal strategy in order to cut leadtimes and optimize storage space and overall efficiency?
- ▶ At what point it makes sense using a 2-step picking strategy in stead of 1-step picking strategy?



## optiPeak Peak Capacity Optimization

### Questions:

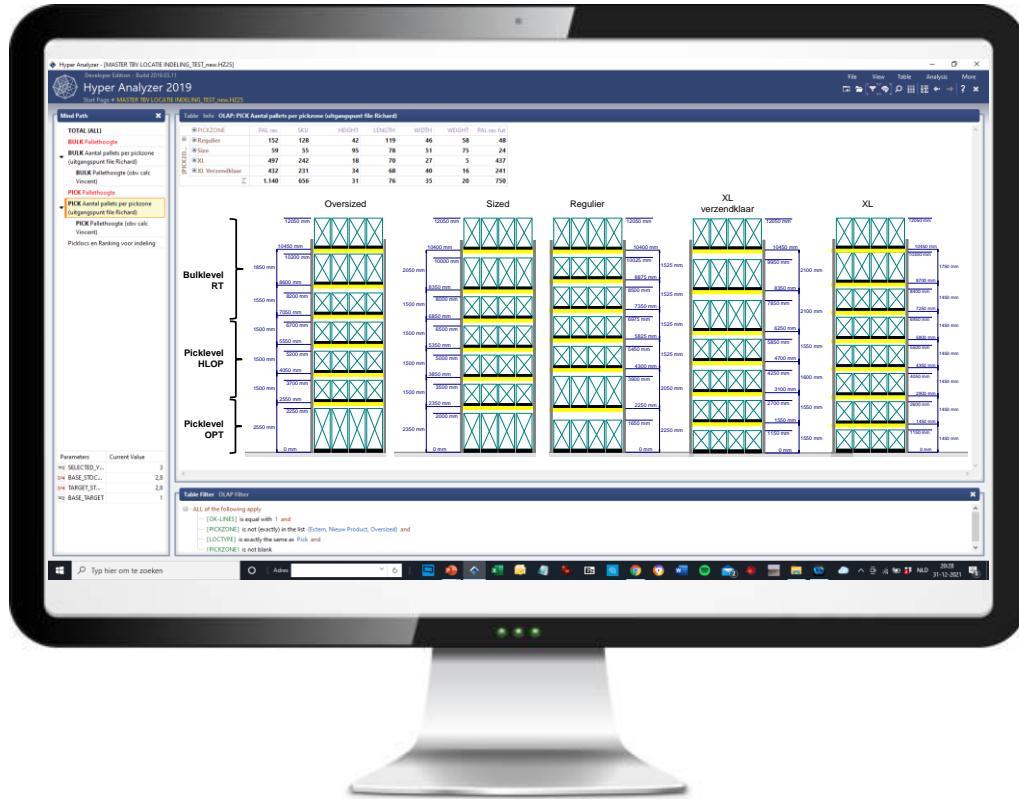
- ▶ What throughput (peak) volumes must be processed within our warehouse and what peak (system)capacity is required?
- ▶ How is an easy scale up and -down of required (peak) capacity guaranteed?
- ▶ In what way can dependencies between processes be limited, (use of decoupling buffers f.e.)?
- ▶ How do orders -coming in just before cut-off- look like regarding complexity, volume and mix in order being fulfilled and shipped in time?



## optiBin Bin Type Optimization

### Questions:

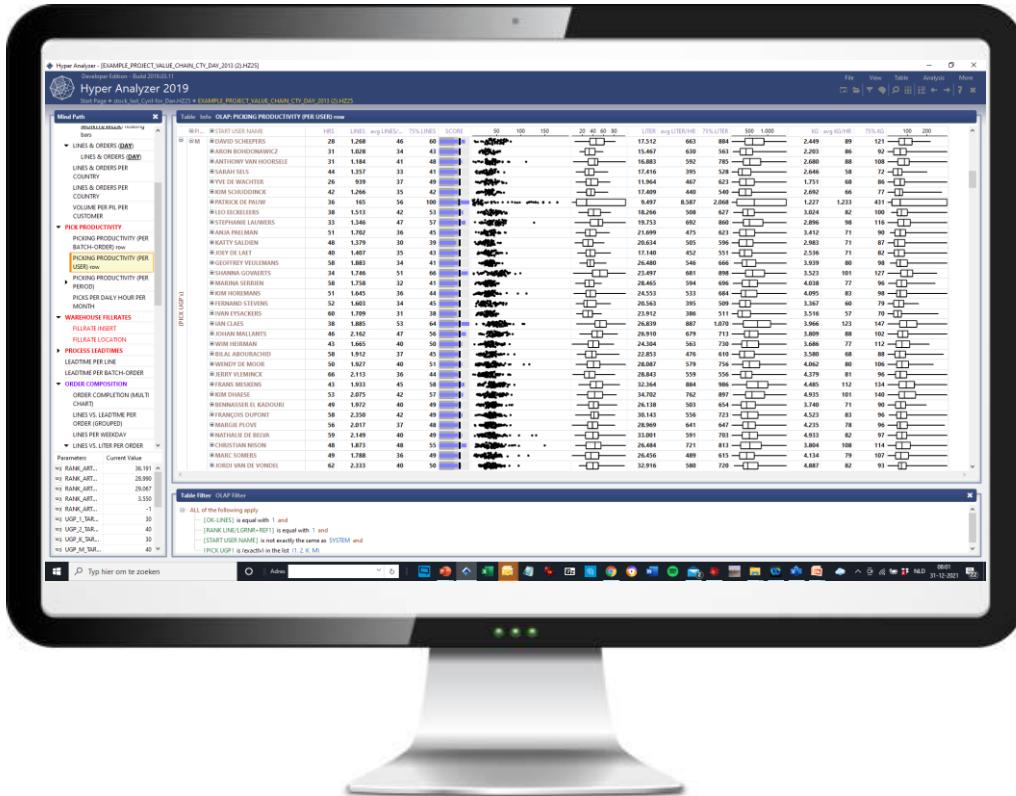
- ▶ What is the best binsize for us taken stock heights, product characteristics and dimensions into account?
- ▶ Do we need to store products in bins, in cartons (as received) or as loose products (taken out of received bins) in our VLMs?
- ▶ What is the impact of using bins in our pickfaces in stead of loose product or cartons?
- ▶ For our piece picking operation, do we need to pick in order bins or directly into customer order cartons?



## optiFace Pick Face Optimization

### Questions:

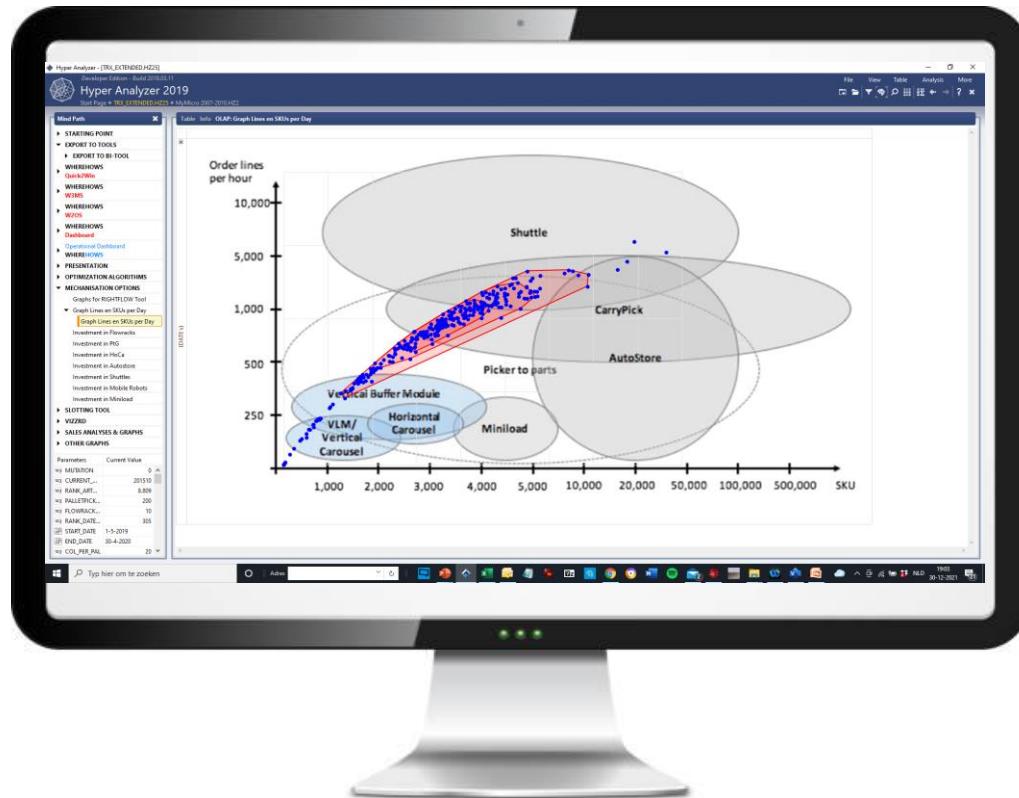
- ▶ How much pickface should each SKU be allocated to minimize picking and restocking costs?
- ▶ What is the optimal amount on variety of pickfaces in relation to flexibility, space utilization and reshuffling/restocking?
- ▶ What is the impact of synchronizing incoming order quantities and available pick face quantities to avoid inefficient replenishment activities?
- ▶ What is the impact of using bins at inbound on the efficiency rate (putaway/picking/reslotting) and fillrate of the warehouse?



**optiForce**  
Work Force  
Optimization

## Questions:

- ▶ What is the optimal number and mix of fulltime, temporary and overtime employment in our operation?
- ▶ What are pick, pack and put away productivities of our operators and what should be norm productivities?
- ▶ Which order patterns have impact on fluctuations in workload over days, weeks and months?
- ▶ How can be predicted what the required manpower capacity should be in a specific period?



## optiMate

### Automated/Robotized System Optimization

#### Questions:

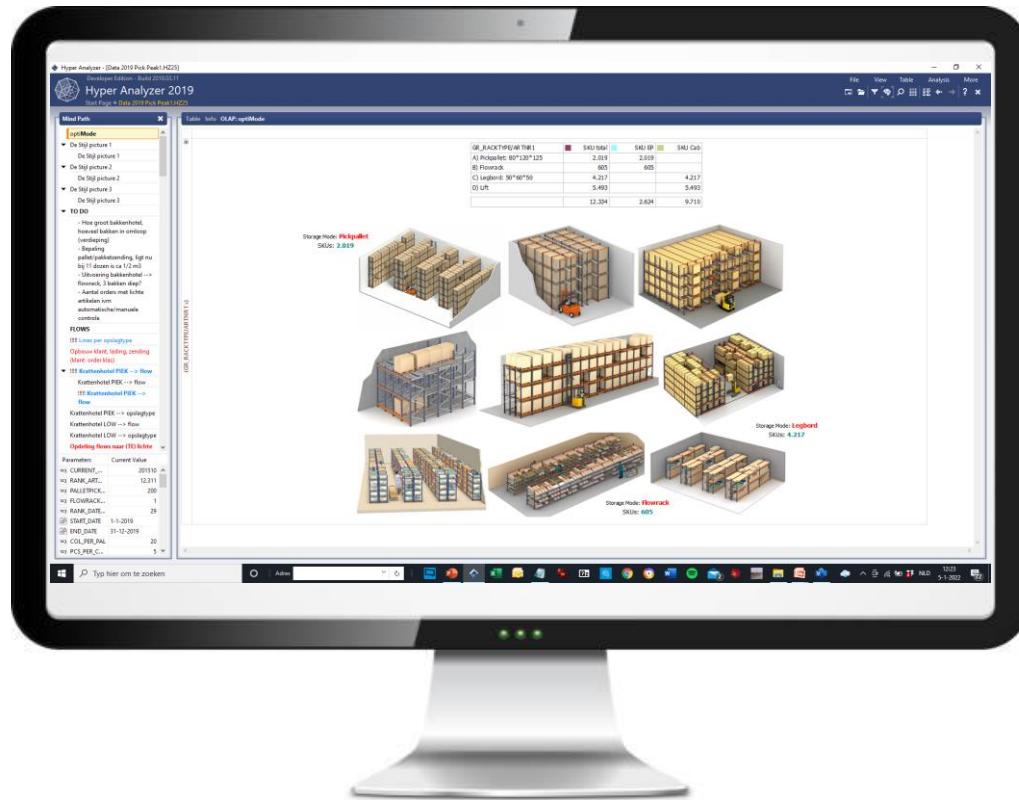
- ▶ How do these automated solutions score on throughput, flexibility, scalability and storage density?
- ▶ For which part of our orders, assortment is automation a valid alternative?
- ▶ Which automated/robotized solutions are cost-efficient for us?
- ▶ How does a configuration look like with specific automated systems (f.e. autostore, shuttle system or mobile robots)?
- ▶ What is the maximal leadtime for an order using automated/robotized systems?



## optiCost Operational Cost Optimization

### Questions:

- ▶ What does our operation cost taken processes (pick/pack/put/plen/ship) resources (manpower/equipment) into account?
- ▶ Is the use of VLMs with/without conveyors (zone- or multi-order picking) obvious (increasing productivity x decreasing space)?
- ▶ What overall cost impact have automated/robotized systems on higher throughput volumes (both in productivity as operating hours), improved quality vs limited manpower?
- ▶ In what way can workload be optimized, so manpower utilization increases and idle time decreases?



## optiMode Storage Mode Optimization

### Questions:

- ▶ What storage mode for each SKU (and pick face configuration) minimizes our total warehousing costs?
- ▶ How do different storage modes score on gross- and nett storage volume (density), flexibility (single-/multi-deep), handling speed, flexibility, safety and cost per pallet(handling)?
- ▶ At what point it makes sense using automated/robotized storage modes instead of conventional?