# Optimising Deliveroo HOP Operations Through Simulation Modelling

Faced with increasing demand to improve fulfillment speed and operational efficiency, Deliveroo partnered with Green Vertex to create a digital twin of their HOP sites. This project used simulation modelling to test process changes, evaluate performance scenarios, and guide strategic decision-making - all without disrupting live operations.
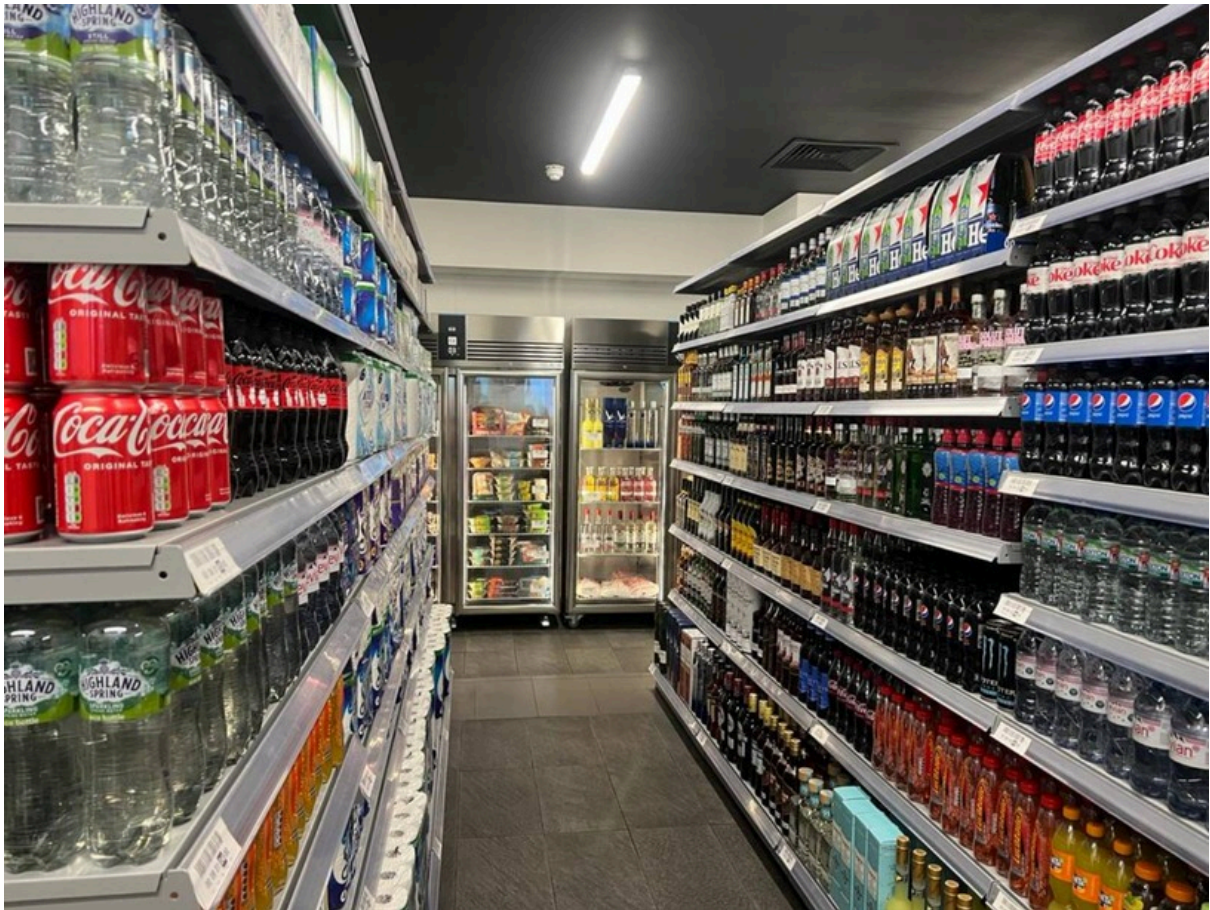
"We had clear performance goals, but testing new processes live was challenging. We needed a way to experiment safely and quickly."

Alex Francis, Head of UK & European Operations, Deliveroo

The Challenge

Deliveroo's HOP sites are a critical part of their on-demand grocery delivery model. However, making improvements to outbound order processing was challenging, complex, and time-consuming in a live environment. The key challenges included:

- Reducing order lead times

- Improving labour efficiency

- Increasing site throughput

- Identifying impactful process changes before implementation

The Green Vertex Solution

We developed a digital twin simulation model of Deliveroo's HOP site, complete with:

- The ability to adjust variables like staffing levels, order volumes, and process variants, and quantify the effect

- A visualised, interactive model of the site layout and picker workflows

- A flexible KPI dashboard tracking key performance metrics (e.g. pick time, pack time, dispatch time)

Our iterative, agile development approach meant Deliveroo's team had frequent demos, continuous input, and early access to decision-making insights.

How AI Enhanced the Solution

As part of the simulation modelling, we applied AI techniques to identify high-impact changes faster and more reliably. Using optimisation algorithms, we automatically explored a wide range of staffing and process configurations — ranking them based on KPIs like lead time and throughput. This helped Deliveroo focus only on the most promising changes, reducing analysis time and supporting faster decision-making.
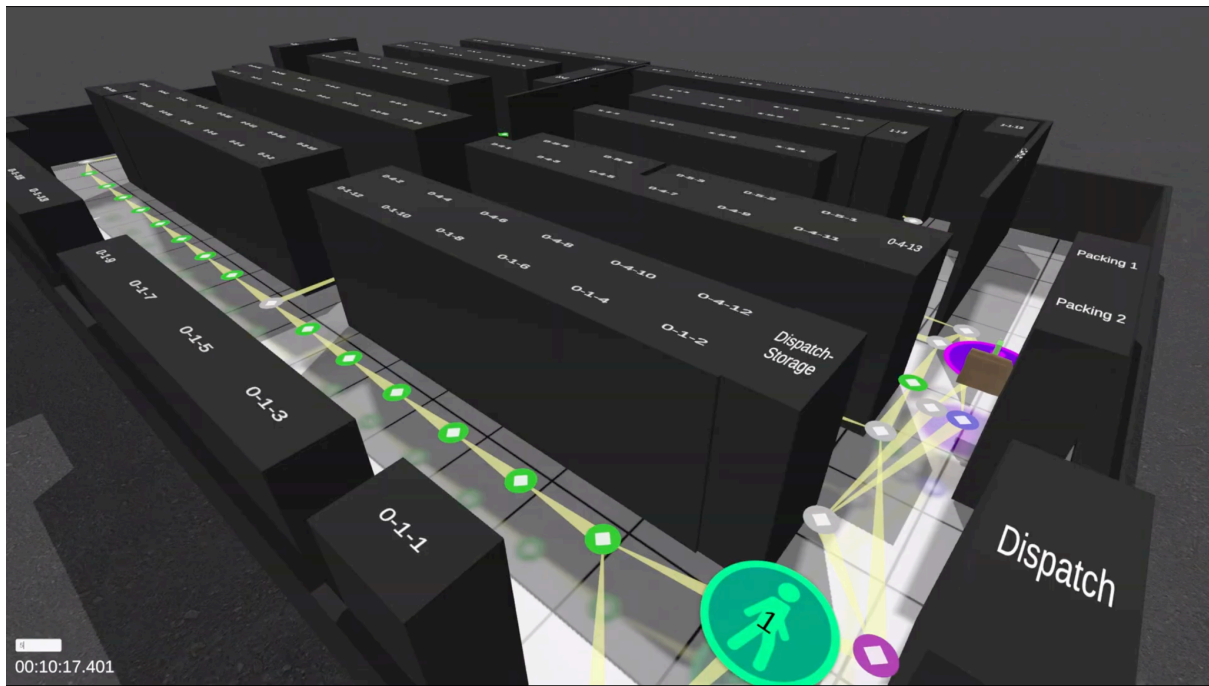
Simulation Features

End-to-End Process

From order receipt to dispatch handoff, capturing physical and behavioural variables

Visual Playback

A clear representation of picker routes and bottlenecks

Scenario Analysis

"What-if" modelling of changes

KPI Dashboard

Real-time feedback on the impact of every change

Full Access to Underlying Data

Simulation data available at a granular level to enable deeper analysis using third party tools

Simulation Runs

ID	Pickers count	Queued Time mean secs	Pick Time mean secs	Pack Time mean secs	Prep Time mean secs	Order Throughput units/hour	Unit Throughput units/hour
NADkS…	5	147.45	75.68	49.33	254.46	18.35	112.50
QCgES…	5	158.48	81.82	35.71	265.01	16.55	103.50
bCTsS…	5	128.76	79.52	52.23	256.51	13.76	91.98
fLuMV…	5	122.20	83.67	34.92	240.15	13.16	91.92
mFF6r…	5	307.33	92.27	54.63	454.87	16.92	130.94
iNLxG…	5	312.49	101.07	34.52	451.18	16.32	131.94
TZVjr…	5	63.59	77.69	50.19	192.27	14.89	99.64
PnY2T…	5	61.05	84.87	35.43	183.64	11.69	96.64
T3Xhb…	5	206.47	89.09	55.02	351.58	24.72	175.65

"The value was almost immediate. We saw in days what would've taken months to test live — and avoided unnecessary cost and complexity in the process."

Alex Francis, Head of UK & European Operations, Deliveroo

The Impact

Within weeks, the simulation uncovered several process improvements:

- Up to **17.2% faster prep time** when using both batch pick and direct to bag

- **5.6% faster prep time** when switching to a direct-to-bag picking model

- Up to **12.2% faster prep time** when switching to batch picking

- Direct to Bag and Batch Pick combined allows Deliveroo to optimise labour whilst maintaining average order lead time

All with Zero disruption to live operations — all insights gained safely in the digital twin

By implementing the above processes in their live operations, Deliveroo are able to realise significant reduction in staff costs as well as improvements to customer experience as a result of reducing order lead time.

"This project has fundamentally changed how we think about operational change. Simulation is now a core part of our decision-making toolkit."
Alex Francis, Head of UK & European Operations, Deliveroo

Outcomes

- Deliveroo will integrate simulation into their **ongoing ops optimisation strategy**

- Internal teams are being upskilled in simulation and visualisation tools

- Future simulations to be automated via the **Green Vertex Orchestration Platform**