

Digital Twin of picking operations in the fulfilment centres of an online supermarket

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With thanks to: Jacob Whyte, Alexandru Petrencu, and Vidina Rodriguez

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DECISION LAB

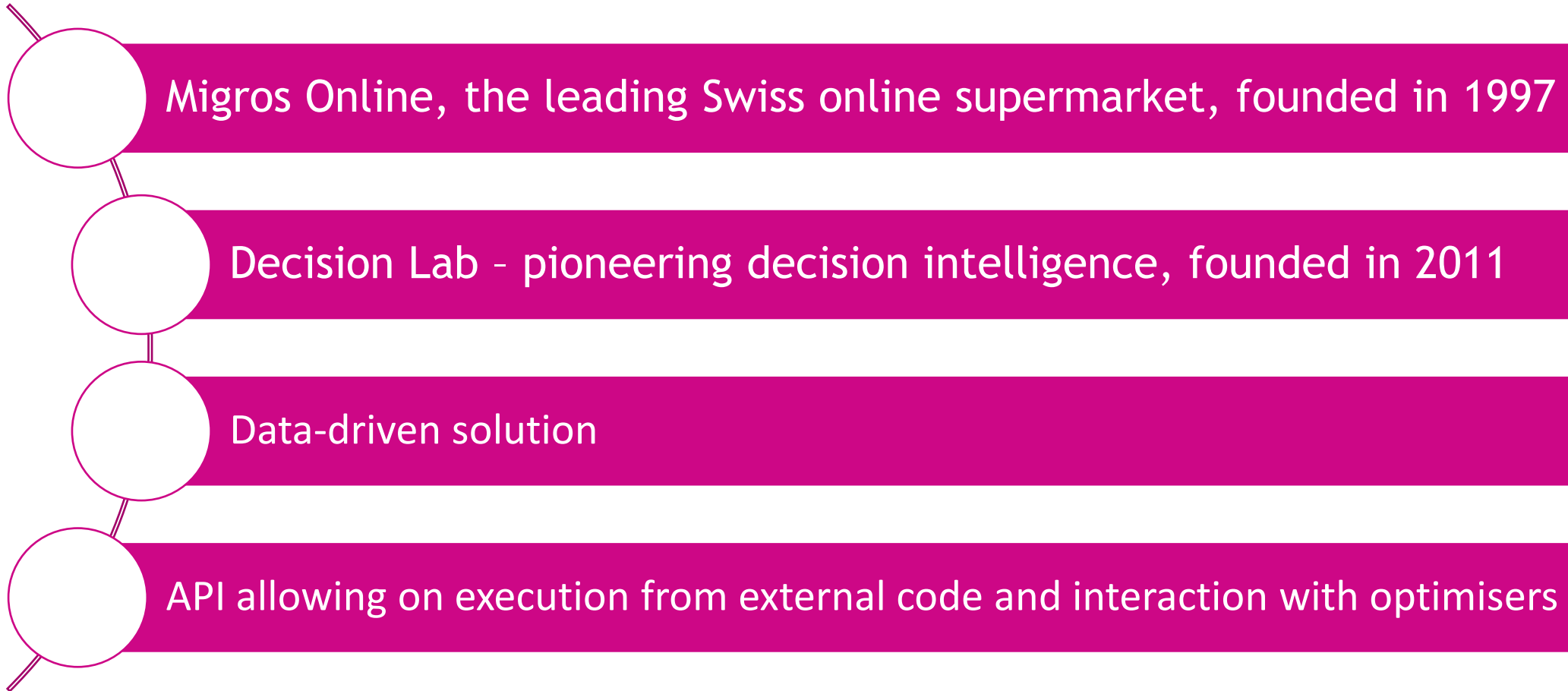
MIGROS

Online

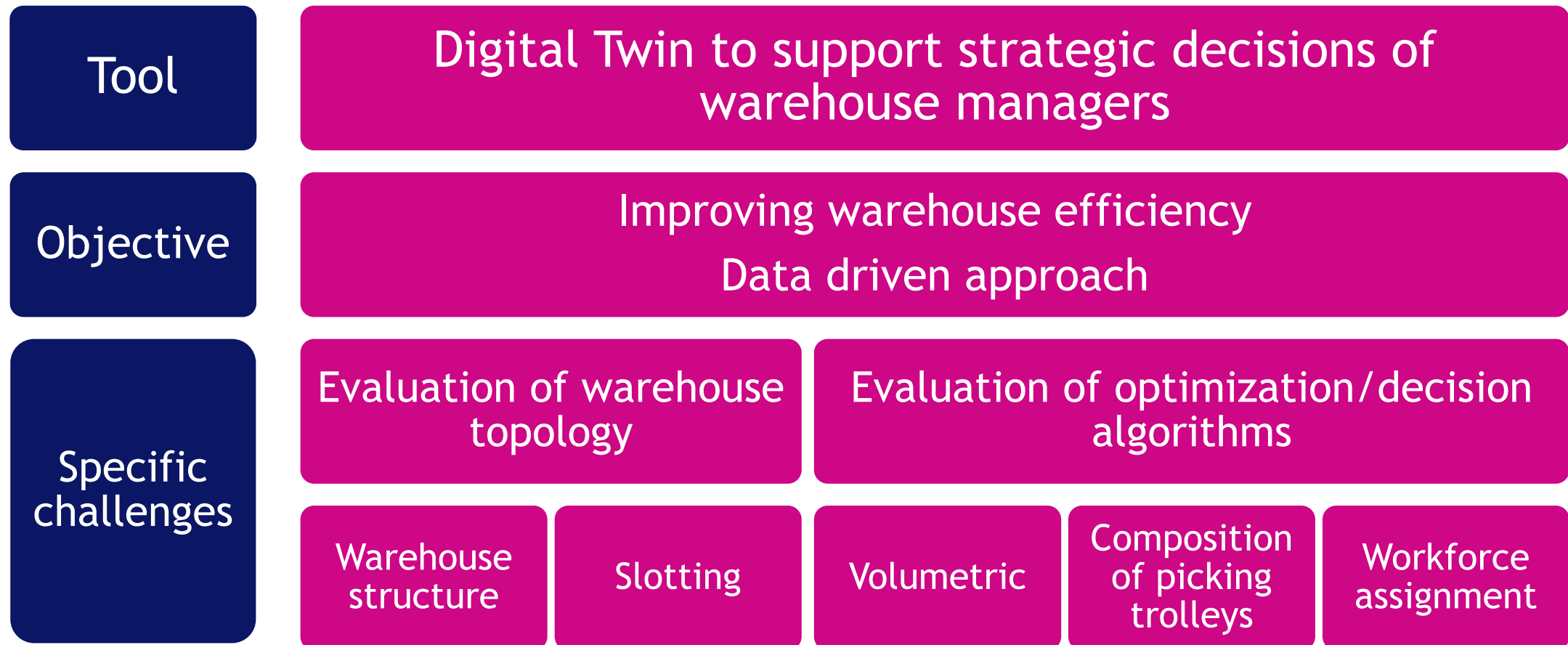
01

Overview

Executive Summary



Business Needs



The Team

MIGROS
Online



Warehouse Manager
& Associate

Provide input information



Java Developers

Build APIs / interfaces for
external running, inputs, and
optimisers



Simulation Consultants

AnyLogic modelling and
visualisation



02

AnyLogic Model

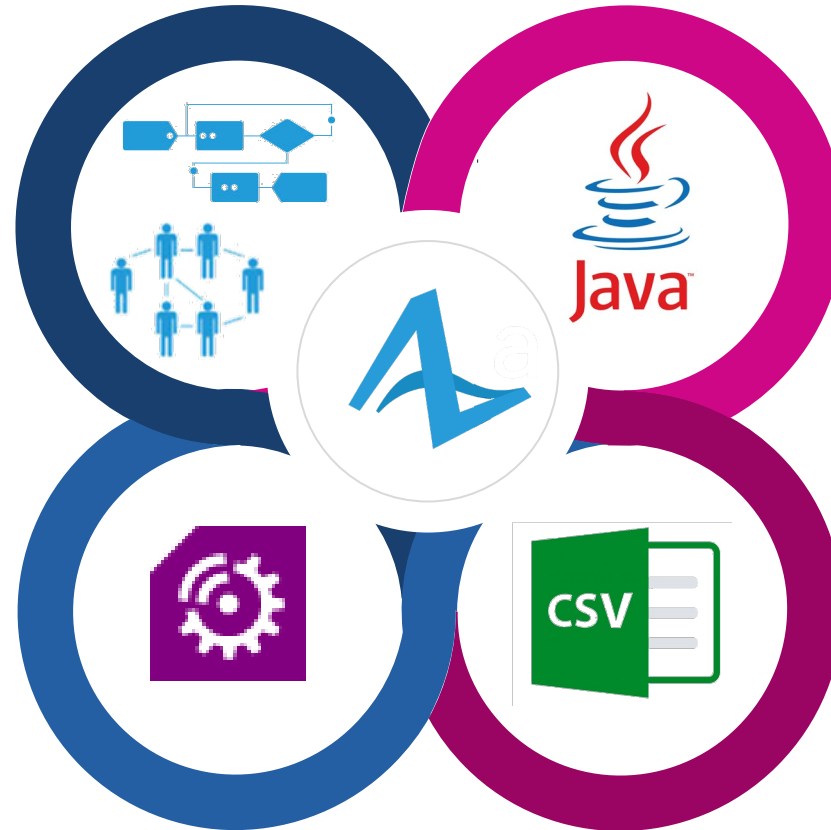
Choosing AnyLogic

Discrete Event and Agent-Based Modelling

Combine simulation paradigms to make a more realistic model.

Customisable Transporter Library

In-built behaviour to support transport of products by trolleys. Customisable, using Java, to meet bespoke requirements.



Java Connectivity

Integrate with external Java code as part of a more complex decision-making system. Execute model programmatically.

Data Driven

Simulate variations of centre layout and operational rules by changing CSV inputs (not underlying code).



Core Components (1)

The screenshot shows the 'Migros Warehouse Sim' interface in '2D View'. The main workspace displays a 2D floor plan of a warehouse with several areas (Area 1, Area 4, Area 10, Area 6) and a network of paths and conveyors. A red callout box points to 'Area 1', a blue callout box points to a yellow buffer area, and a green callout box points to a conveyor system. The interface includes a top navigation bar with buttons for 'Workforce', 'KPIs', 'Metrics', and 'Logic', along with a play/pause button and a timer showing '05:03:49' on '2023-06-05'. A 'VIEW CONTROL' panel on the right allows for adjusting the view layout (Level/Area), scale, and heatmap, and includes a legend for resources, buffers, racks, conveyors, paths, and tasks.

Areas

- Contain products to be picked
- Fleet of trolleys
- Assigned workforce

Paths

- Connect product locations
- Uni- or bi-directional
- Trolley capacity

Buffers

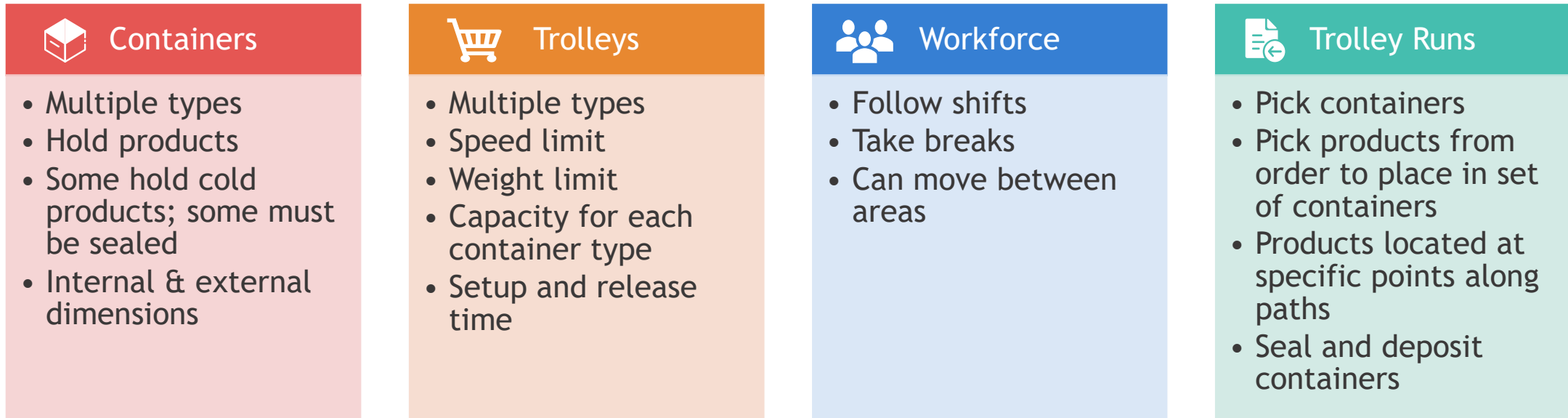
- Storage place for containers
- When full, deposits are suspended

Conveyors

- Transfer containers between areas
- At junctions, merge flow with specific ratios



Core Components (2)

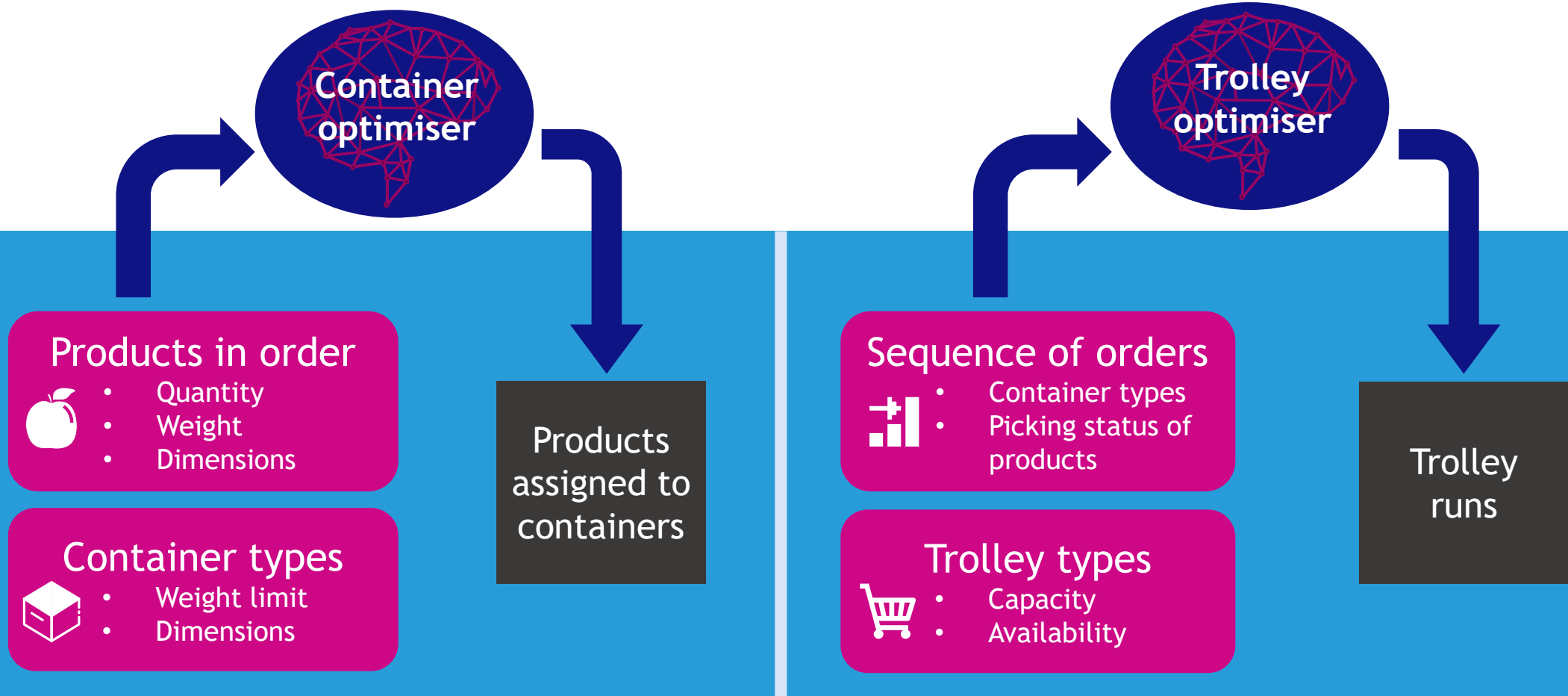


External Java Optimisers

MIGROS

Online

anylogic®



Video Demo



03

Benefits

Benefits



Supporting new change requests in the fulfilment centres.



Testing and assessing of the changes.



First findings: reduction of shipping costs by 4%.



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THANK YOU

Any questions?