MARS
Tomorrow starts today

PLATO
An In-House Supply Planning Tool

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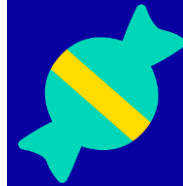The world we want tomorrow starts with how we do business today

MARS

The Five Principles
Quality Responsibility Mutuality Efficiency Freedom

140,000+ Associates
are united and guided by The Five Principles of Mars which span geographies, languages, cultures and generations

1911 — Frank C. Mars made the first Mars candies in his Tacoma, Wash., kitchen
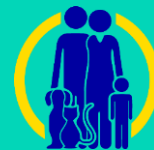
80+ countries in operation

HQ — Global HQ in McLean, Va.

381 SITES

2,500+ VETERINARY HOSPITALS

glassdoor BEST PLACES TO WORK
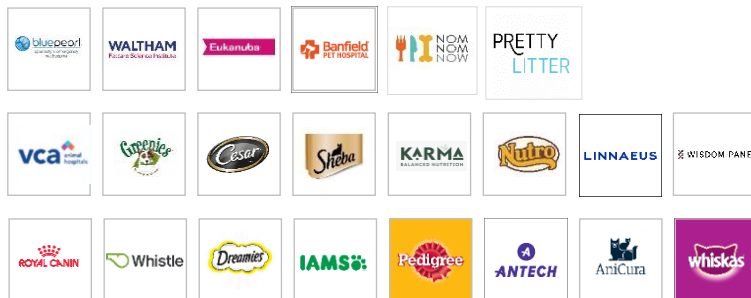
Private, family-owned company
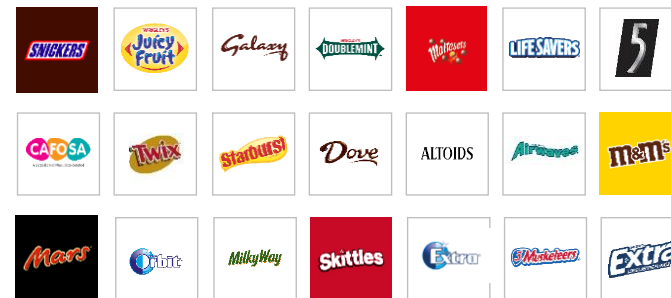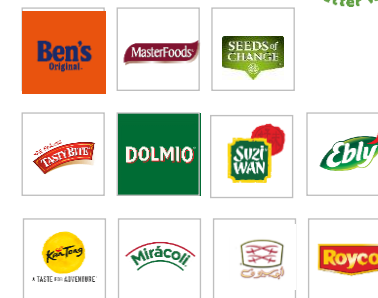
$45B NET SALES

Billion Dollar Brands
Pedigree · ROYAL CANIN · m&m's · SNICKERS · Cesar · Dove · Banfield PET HOSPITAL · bluepearl · whiskas · Extra · vca animal hospitals

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MARS Petcare
A Better World For Pets

bluepearl · WALTHAM Petcare Science Institute · Eukanuba · Banfield PET HOSPITAL · NOM NOM NOW · PRETTY LITTER

vca animal hospitals · Greenies · Cesar · Sheba · KARMA BALANCED NUTRITION · Nutro · LINNAEUS · WISDOM PANEL

ROYAL CANIN · Whistle · Dreamies · IAMS · Pedigree · ANTECH · AniCura · whiskas

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MARS WRIGLEY
better moments make the world smile

SNICKERS · WRIGLEY'S Juicy Fruit · Galaxy · DOUBLEMINT · Maltesers · LIFESAVERS · 5

CAFOSA · Twix · Starburst · Dove · ALTOIDS · Airwaves · m&m's

Mars · Orbit · MilkyWay · Skittles · Extra · M&M's · Extra

MARS Food
Better food today — A better world tomorrow

Ben's Original · MasterFoods · SEEDS of CHANGE

TASTY BITE · DOLMIO · Suzi Wan · Ebly

Kan Tong A TASTE FOR ADVENTURE · Miracoli · Royco

MARS Edge
Better Lives Through Nutrition

foodspring · CocoaVia

About Me

JANA FÄRBER

10 years in AI at Mars

Different roles in R&D and IT

Senior Data Scientist in Supply Chain Advanced Analytics

Driving Digitalization of Supply Chain at Mars

Designing automated & self-learning systems

Enabling a Cognitive Supply Chain

Demand Sensing

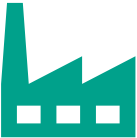Root Cause Analysis

Recommender Systems

ML Ops

Good Python Coding

Reinforcement Learning

MARS

Business Problem

OPPORTUNITY

Switching over to an innovative demand and supply planning tool created opportunity for designing an in-house planning capability.

COMPLEX PRODUCTION LINES

Produce several items concurrently with varying output rates depending on the combination of items produced.

OPTIMAL USE OF RESOURCES

Optimal use sof production capacity while being mindful of storage cost and maximize customer satisfaction.

FLEXIBILITY

Easily cater to plant-specific needs, support scenario-planning type of initiatives.

IMPACT

Half of the volume in target segment and region will be planned using PLATO.

MARS

Why Gurobi?

SPEED

Important to support scenario-planning capabilities in almost real-time.

Gurobi arrives at optimal solutions 70% - 100% faster than other solvers we tested for our purposes.

RELIABILITY

Gurobi always arrived at optimal solutions in our test cases, as opposed to other solvers.

We haven't experienced any techincal issues/bugs on the Gurobi side.

FLEXIBILITY

Usable in Python and with cvxpy.

Simple license activation (both Compute Server and Named User Licenses).

Easy to scale vertically and horizontally.

SUPPORT

Agreeable SLAs in production.

Prompt response time for dev-related and setup questions.

Overall great interaction with Gurobi team.

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PLATO Design Principles

REAL TIME INTEGRATION
Leveraging APIs PLATO seamlessly integrates with API-enabled planning tools. The user can request a PLATO solve straight from the Front End and results will be passed back in real time.
01

ARCHITECTURE
A middleware component is handling the communication between the Front End and a server hosting the Gurobi licenses. The middleware requests input data which is used to stand up the optimization problem, contacts a server to solve the problem and passes back the results to the Front End.
02

SCALABILITY
The middleware has been created such that PLATO is scalable with minimum effort. We can easily accommodate higher throughput as well scaling to new segments and markets.
03

REUSABILITY
PLATO is hosted within Microsoft's Azure Cloud Platform. As such, any market can leverage PLATO for optimized production planning, irrespective of the planning tool they use.
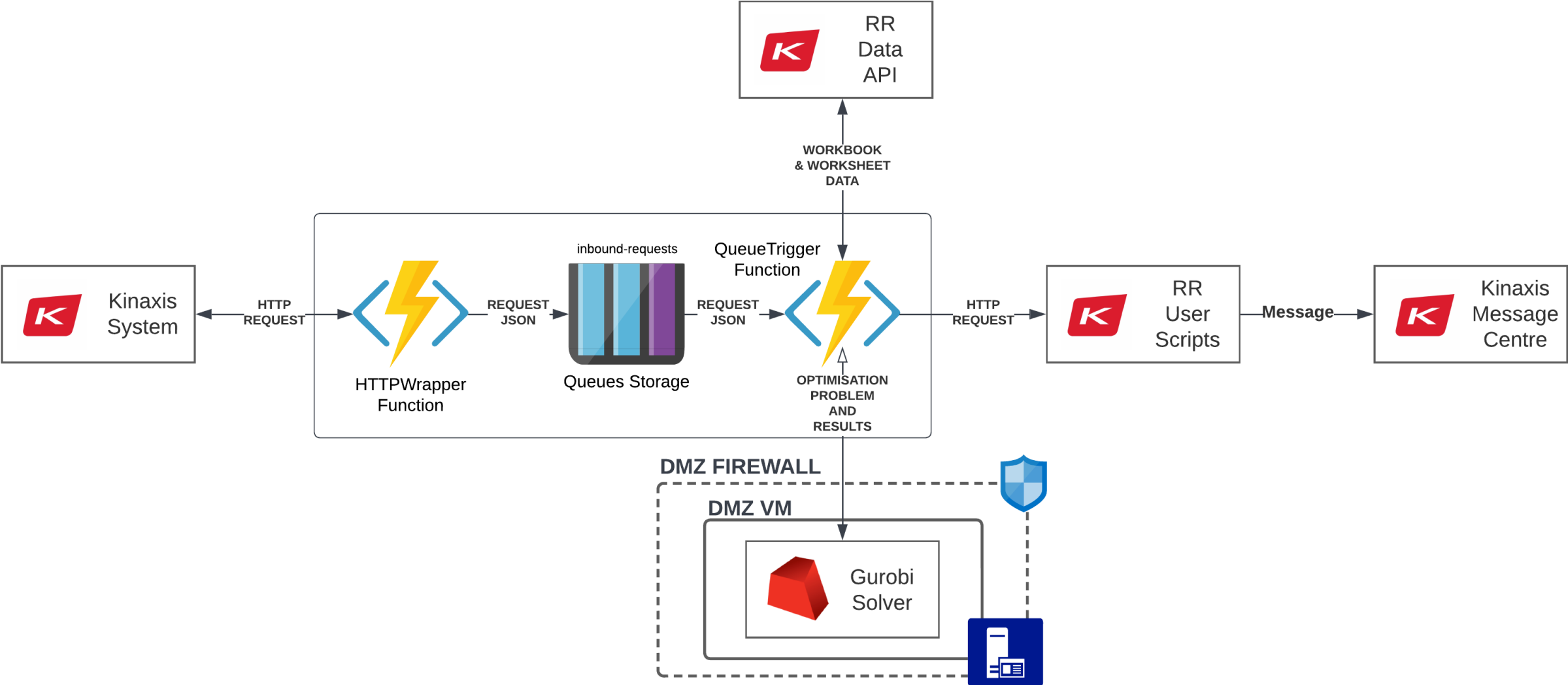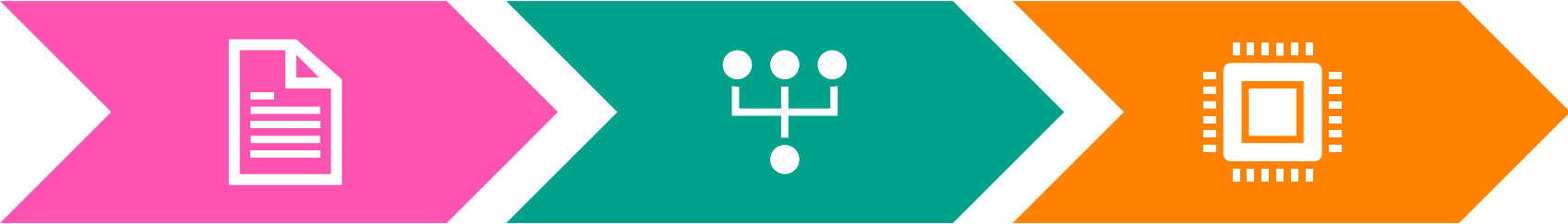**04**

SUPPORT
Long-term support is approached via a combination of Mars Core Services, Kinaxis and Gurobi Support.
05

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Solution Architecture

PLATO Optimization Routine

INPUT DATA

Automated Data

Manual User Input:
    Hard & Soft constraints
    Switches

DATA PREPROCESSING

Formatting

Time Phasing

DEFINE & SOLVE OPTIMIZATION PROBLEM

Obtain the optimal run times of items on production lines such that:

➤ we meet as much demand as possible *while*

➤ minimizing excess stock *and*

➤ allowing users to control stock pre-built, choice of production resources *subject to*

➤ specified hard constraints.

MARS

Thank you for listening ☺

Thank you, Team!

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