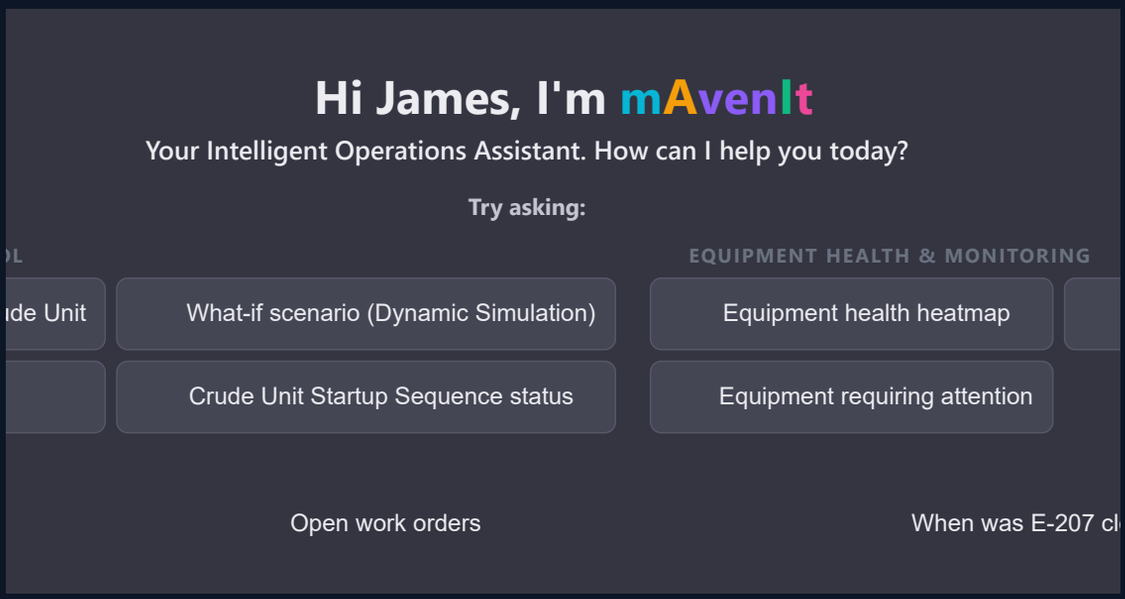
Maven ProTech

Intelligent technology for people and plants of tomorrow

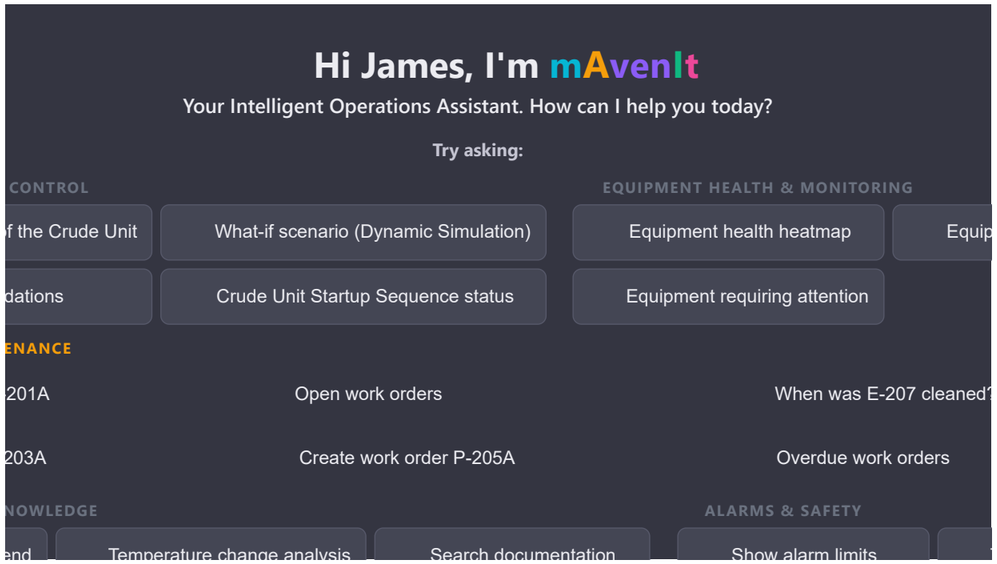


Intelligent Energy Operations

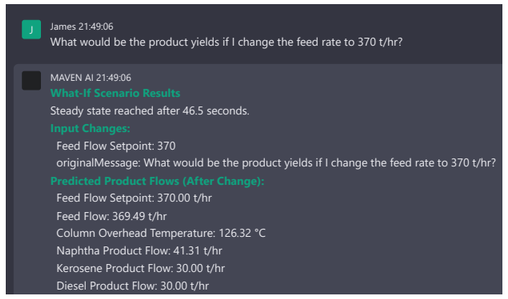
Proven Industrial Technologies — Powered by AI

Conversational Plant Intelligence

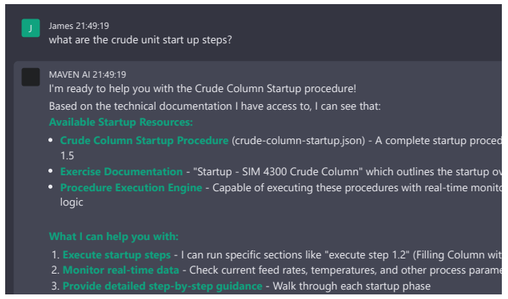
mAvenIt is the conversational layer over the entire plant. Operators query live process state, execute procedures and run what-if scenarios; engineers retrieve calculations, P&ID context and design limits; maintenance teams pull asset history, failure modes and work orders — all in plain English, with role-aware responses tailored to each user.



MAVENIT LANDING SCREEN — OPERATOR JAMES GREETED BY NAME, CONTEXT-AWARE QUICK ACTIONS FOR THE CRUDE UNIT



WHAT-IF EXCHANGE — FEED-RATE SCENARIO ANSWERED WITH PREDICTED PRODUCT YIELDS DIRECT FROM THE DIGITAL TWIN



KNOWLEDGE QUERY — STARTUP-PROCEDURE ANSWER WITH CITED SOURCE DOCUMENTS AND PAGE REFERENCESS

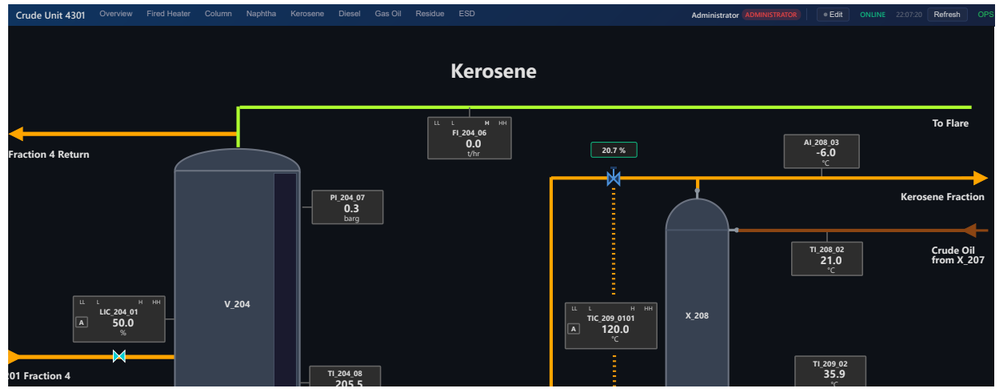
- Natural-language queries against live OPC tag data
- Procedure execution by description (“autonomous start up”)
- Knowledge retrieval over plant manuals and operating procedures
- What-if simulation answered in seconds from the digital twin

- Step-by-step narration of every running automated sequence
- Sources panel — every answer cites the documents it drew from
- Operator / engineer / admin role-aware responses
- Deployed once, available on desktop, tablet and mobile

NATURAL LANGUAGE | PROCEDURE EXECUTION | WHAT-IF | KNOWLEDGE RETRIEVAL | MULTI-INDUSTRY

Digital Twin

A live first-principles model of the running plant — operators see the process state and what the model says it should be doing.

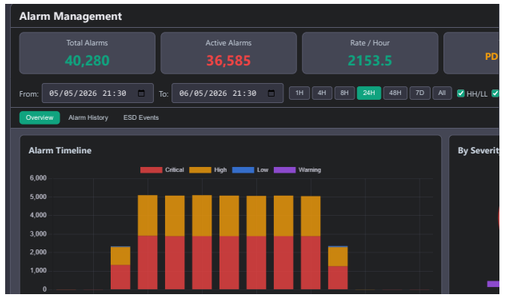


LIVE BATCH REACTOR DIGITAL TWIN; EVERY CONTROLLER AND FLOW UPDATED AGAINST SIMULATOR GROUND TRUTH

- First-principles model alongside the live process
- What-if scenarios — test setpoint changes risk-free
- Operator training in identical simulated environment
- Per-unit screens (column, heater, side-strippers)

Alarm intelligence

Plant-wide alarm management — severity ranking, top-offender analysis, ESD audit.

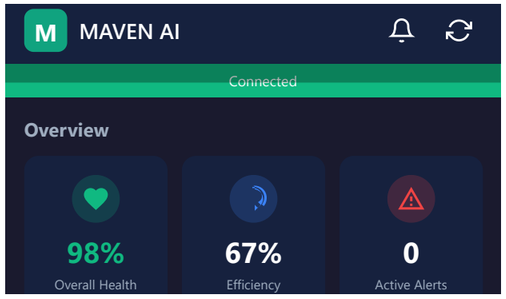


14-DAY ALARM HISTORY WITH SEVERITY MIX & TOP-TAG RANKING

- Configurable date / severity / state filters
- Top-offender ranking, ESD audit, MTTR

Plant in Your Pocket

Real-time KPIs, equipment health and alerts on iOS / Android — for engineers, supervisors and management on the move.



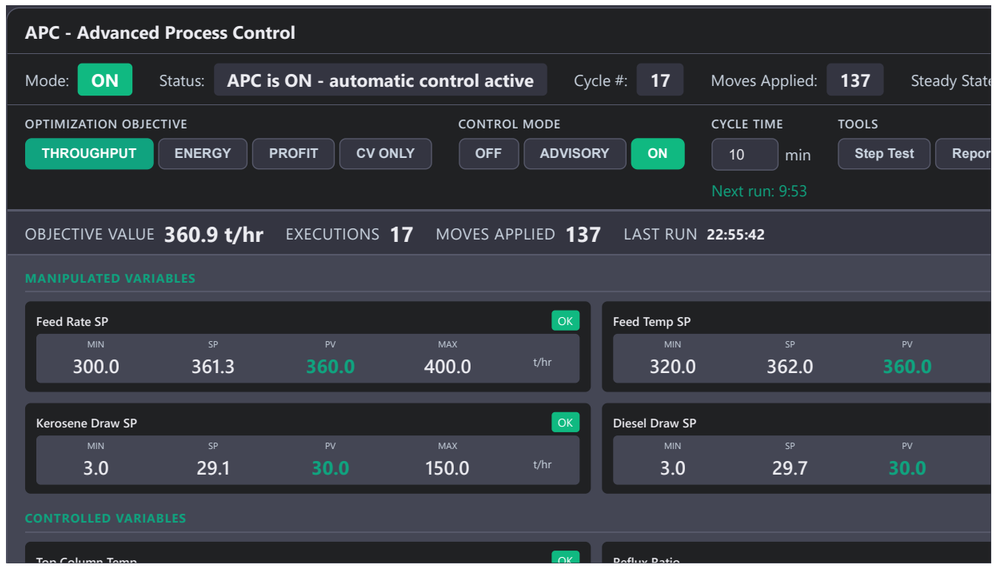
MAVEN AI MOBILE — EQUIPMENT HEALTH & ALERTS

- Live KPIs & per-asset health every 10 s
- Push alarms; offline-ready PWA

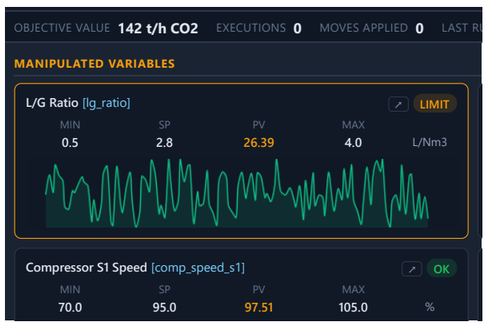
LIVE TWIN | WHAT-IF | ALARM RATIONALISATION | ESD AUDIT | MOBILE-READY

Advanced Process Control

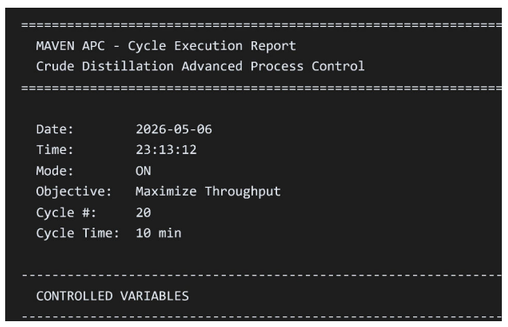
Multivariable model-predictive control across the unit — pushing throughput, energy and yield closer to constraints while respecting safety limits. One MPC engine for crude distillation, batch reactors, and every supporting utility loop.



APC PARAMETER SUMMARY — MANIPULATED, CONTROLLED AND DISTURBANCE VARIABLES, EACH WITH MIN / LL / PV / HL / MAX CONSTRAINT BANDS AND LIVE TREND



MANIPULATED VARIABLE DETAIL — FEED RATE SETPOINT WITH MIN / LL / PV / HL / MAX CONSTRAINT BAND AND LIVE TREND



APC REPORT — MOVES APPLIED, CYCLE HISTORY AND ECONOMIC OBJECTIVE TRACKING AGAINST APC ON / OFF

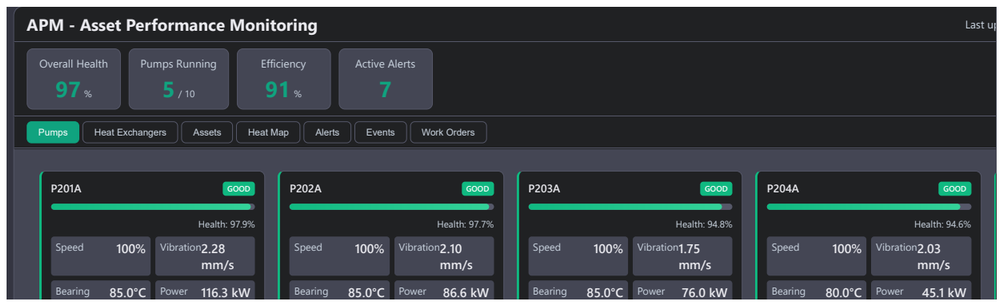
- Multivariable MPC with constraint-pushing economics
- Throughput / energy / profit / CV-only objectives
- Step-test campaign tooling for gain-matrix data collection

- MV / CV / DV bands always visible with live trends
- Move suppression and rate-of-change limits per variable
- Apply / reject every cycle with a one-click commit gate

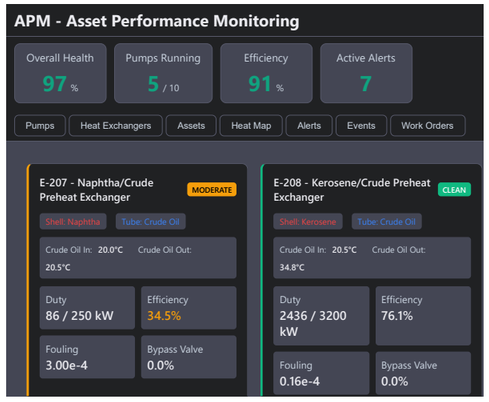
MPC | CONSTRAINT PUSHING | STEP TESTING | MULTI-OBJECTIVE | AUDIT-READY

Asset Performance Management

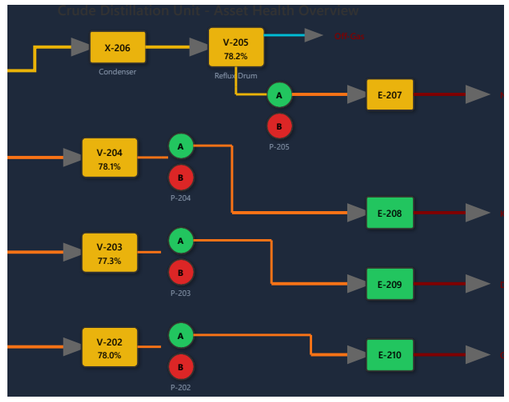
Predictive maintenance for pumps, heat exchangers, reactors and compressors — health scoring, vibration analysis, time-to-failure estimates. Move from time-based to condition-based maintenance and stop chasing unplanned downtime.



ASSET HEALTH DASHBOARD — OVERALL HEALTH, EQUIPMENT RUNNING COUNT, PER-PUMP HEALTH CARDS WITH VIBRATION, BEARING TEMPERATURE AND MOTOR POWER



HEAT-EXCHANGER HEALTH CARD — DUTY, FOULING, CLEANING RECOMMENDATION, TUBE/SHELL TEMPERATURES AND U-COEFFICIENT DEVIATION



EQUIPMENT HEALTH HEAT-MAP — AT-A-GLANCE PLANT-WIDE CONDITION VIEW, AMBER AND RED CELLS FLAG THE ASSETS DEMANDING ATTENTION

- Live health scoring per asset, updated every poll
- Frequency-domain vibration analysis for rotating equipment
- Time-to-failure prediction from condition-monitoring streams

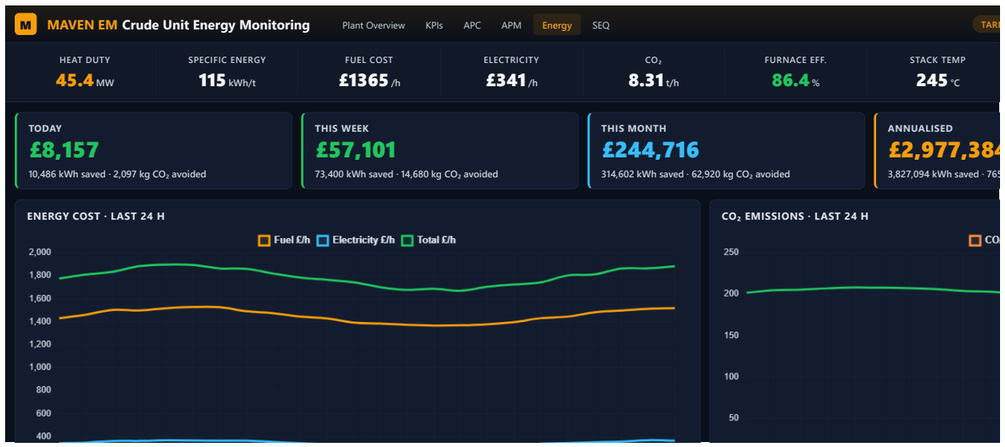
- Heat-exchanger fouling tracking with cleaning recommendations
- Auto-generated work orders feeding into CMMS / EAM
- Maintenance history on every tag, queryable from the chat

PREDICTIVE MAINTENANCE | VIBRATION ANALYSIS | TIME-TO-FAILURE | WORK ORDERS | CMMS READY

MAVEN EM | ENERGY MONITORING

Energy Monitoring

Real-time energy accounting across the unit — fuel and electricity in, useful heat to crude, stack and radiation losses, CO_2 by source. Mock data shown; wires to live OPC and metering once `/api/energy/live` is in place.

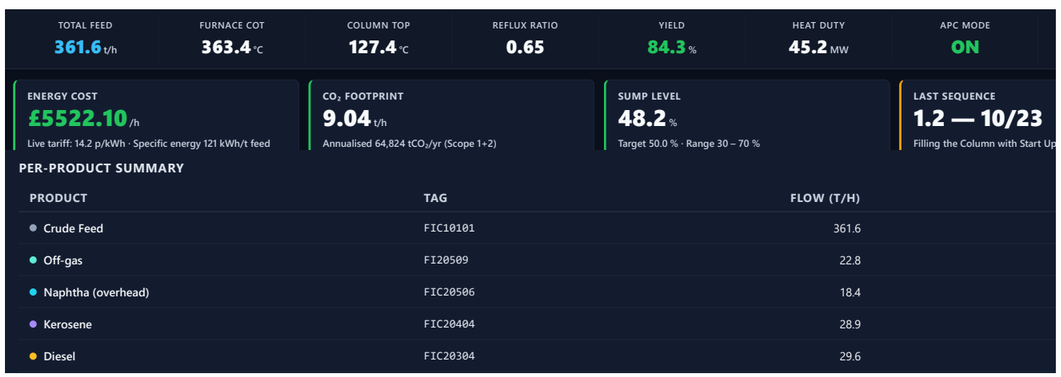


MAVEN EM DASHBOARD — HEAT DUTY, SPECIFIC ENERGY, FUEL + ELECTRICITY COST, CO_2, FURNACE EFFICIENCY, SAVINGS FORECAST AND PER-EQUIPMENT ENERGY TABLE

MAVEN KPIS | PROCESS KEY PERFORMANCE INDICATORS

Process KPIs

Live plant-wide KPI dashboard — total feed, column top temperature, reflux ratio, yield, heat duty, APC mode and active alarms — backed by a per-product summary table that updates every five seconds against the steady-state simulator.



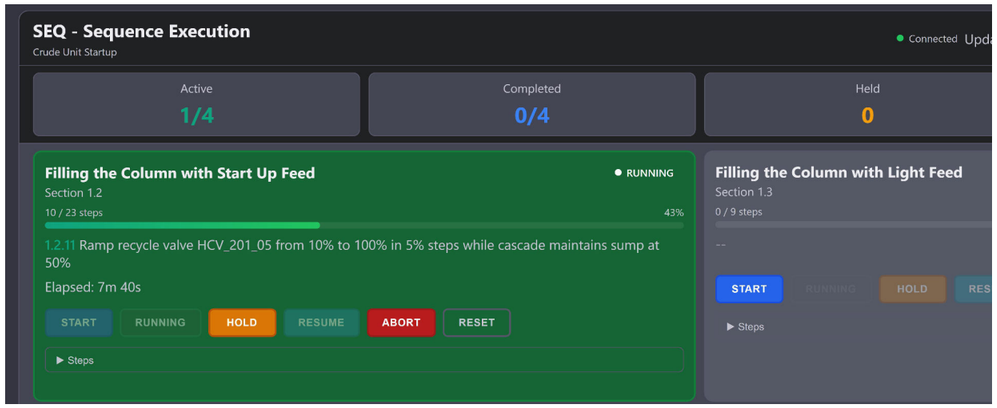
MAVEN KPIS DASHBOARD — TOP KPI STRIP, PER-PRODUCT SUMMARY TABLE WITH MASS-BALANCE VERIFICATION, 24-H PRODUCTION AND ENERGY TRENDS

ENERGY IN/OUT/LOSS | LIVE KPIS | MASS BALANCE | PER-PRODUCT YIELD | CO_2 ACCOUNTING

MAVEN SEQ | SEQUENCE EXECUTION

Sequence Execution

Autonomous startup, shutdown and procedural operations on the crude side — chained sections with HOLD / RESUME / ABORT at every gate



AUTONOMOUS CRUDE UNIT STARTUP MID-RUN; SECTION 1.2 RUNNING (10/23 STEPS), HOLD / RESUME / ABORT LIVE, SECTIONS 1.3, 1.4 AND 1.5 QUEUED

- ISA-88 phases with start, end and operator on every record
- Raw-material lot tracking with target / actual / deviation
- Quality results on every batch with USL / LSL pass / fail
- 21 CFR Part 11-style three-way electronic signature

MAVEN BATCH | BATCH EXECUTION

Batch Execution

ISA-88 batch execution with full electronic batch records — phase log, raw-material reconciliation, quality results and three-way electronic signature.

ELECTRONIC BATCH RECORD; RECIPE ER-100, 8 PHASES, RAW-MATERIAL RECONCILIATION, QUALITY RESULTS, THREE-WAY ELECTRONIC SIGNATURE

- ISA-88 phases with start, end and operator on every record
- Raw-material lot tracking with target / actual / deviation
- Quality results on every batch with USL / LSL pass / fail
- 21 CFR Part 11-style three-way electronic signature

AUTONOMOUS STARTUP | ISA-88 | EBR | 21 CFR PART 11 | OPERATOR CONFIRM

Maven ProTech

Intelligent technology for people and plants of tomorrow

Ready to Transform Your Energy Operations?

AUTOMATE
From startup sequences to dispatch optimisation, let our proven technologies - Powered by AI, handle the complexity.

OPTIMISE
Maximise generation, minimise losses, and capture every revenue opportunity.

PREDICT
Anticipate equipment failures before they impact availability or safety.

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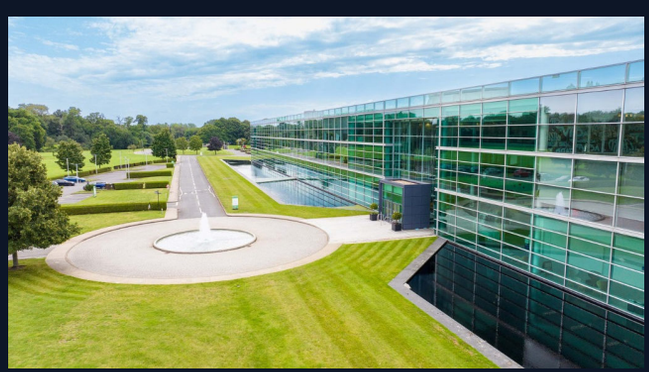

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