TECHNICAL OVERVIEW / AUTONOMOUS INDUSTRIAL AI

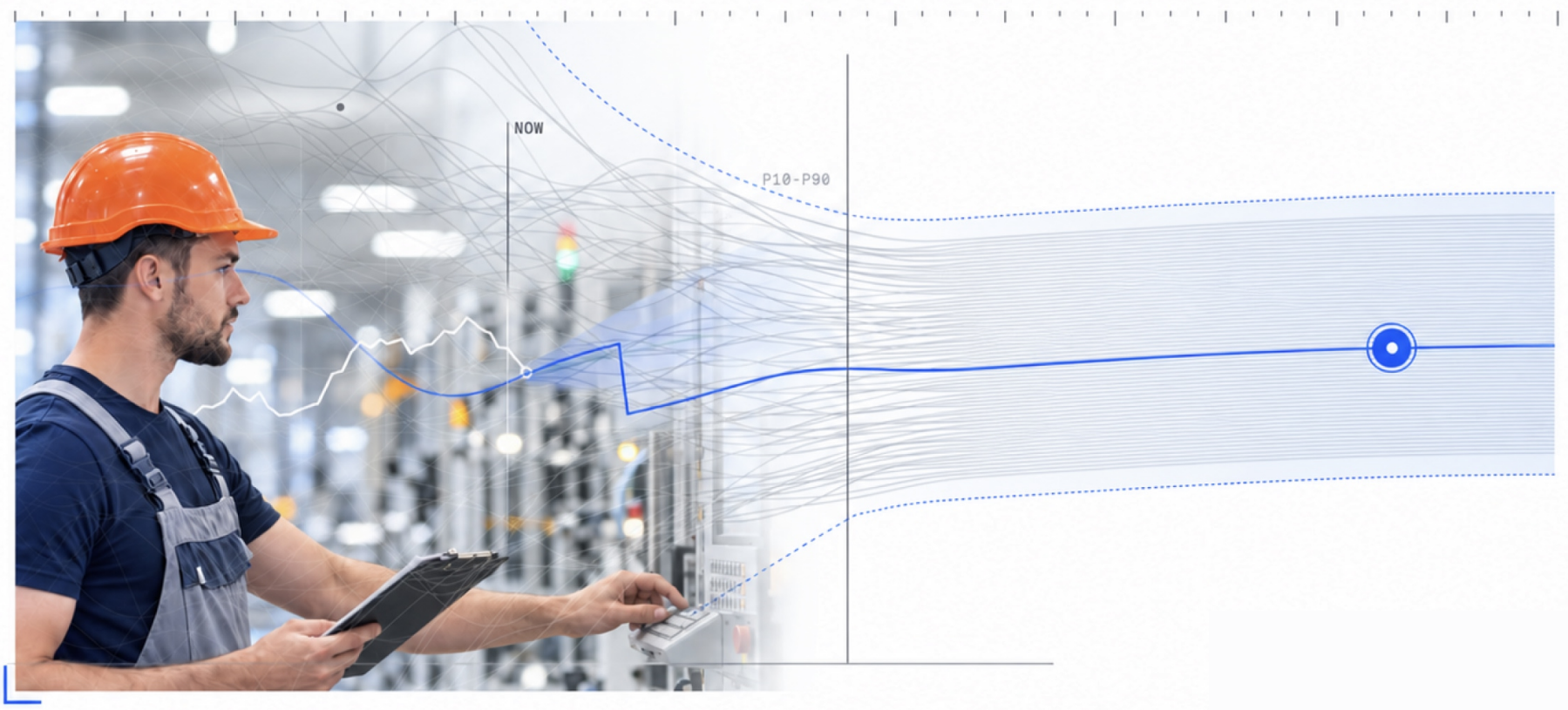
Industrial Operator (IO)
Technical Overview



TECHNICAL OVERVIEW / AUTONOMOUS INDUSTRIAL AI

Continuous reasoning.
Live operations.

A mission that continues as conditions change. Reasoning across longer operational horizons.



Connected to your systems.
Governed by your rules.

Industrial Operator combines structured operational context, specialised agents and governed action around a defined industrial mission.

01 / AUTONOMOUS REASONING SYSTEM

Bound the context.
Coordinate the reasoning.

ARS organises a standing mission into a predefined responsibility structure. Each agent reasons over a limited view of operational state; parent agents coordinate aggregated views.



CONCEPTUAL RESPONSIBILITY STRUCTURE / DELEGATE DOWN · REPORT UP

01 / CONTINUITY

Event-driven operation

Subscriptions, schedules and triggers activate reasoning within the standing mission.

02 / STATE

Persistent context

IO stores conversations and subscriptions in databases, preserving context across restarts. Working and experience memory have separate lifecycles.

03 / COORDINATION

Explicit responsibilities

Agents delegate, report and escalate within defined authority. Structured tools connect reasoning to systems and people.

04 / IMPLEMENTATION

Industrial foundation

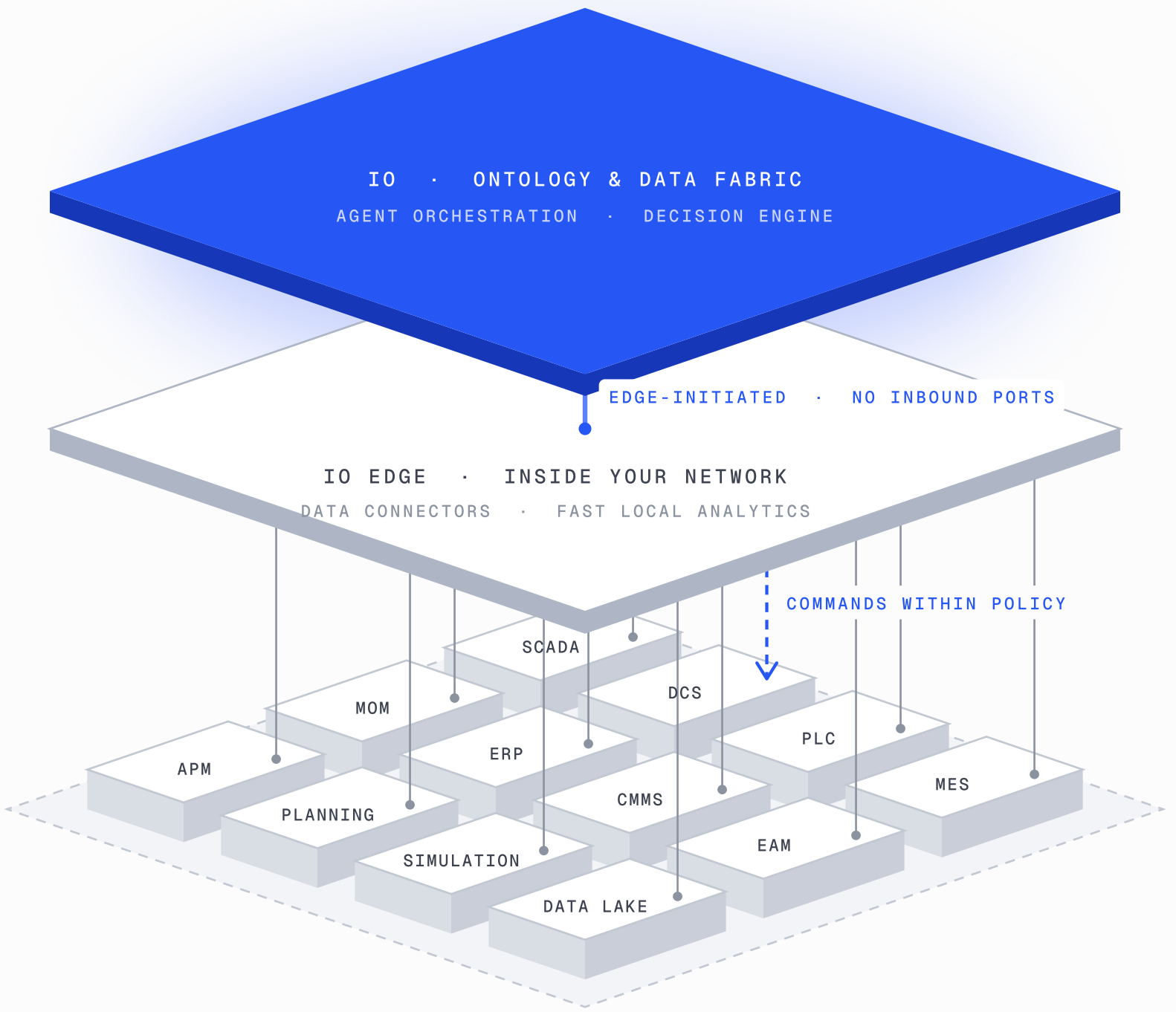
The technical note describes SmartNodes++ and WinCC OA Plant Models, a WinCC OA event plane and Python orchestration.

Distributing operational context keeps each reasoning scope bounded as the mission continues.

REASONING → ARCHITECTURE

02 / HOW IO INTEGRATES

IO sits above your existing systems.



01 / CONNECT

Edge connectors inside your network

Data connectors and fast local analytics on IO Edge · Open standards, vendor-agnostic

02 / MODEL

One ontology across every source

Ontology & data fabric over SCADA, DCS, PLC, MES, ERP and data lakes

03 / REASON

A dedicated decision engine

Agent orchestration & decision engine · Isolated environment, no public ingress

04 / ACT

Commands within approved policies

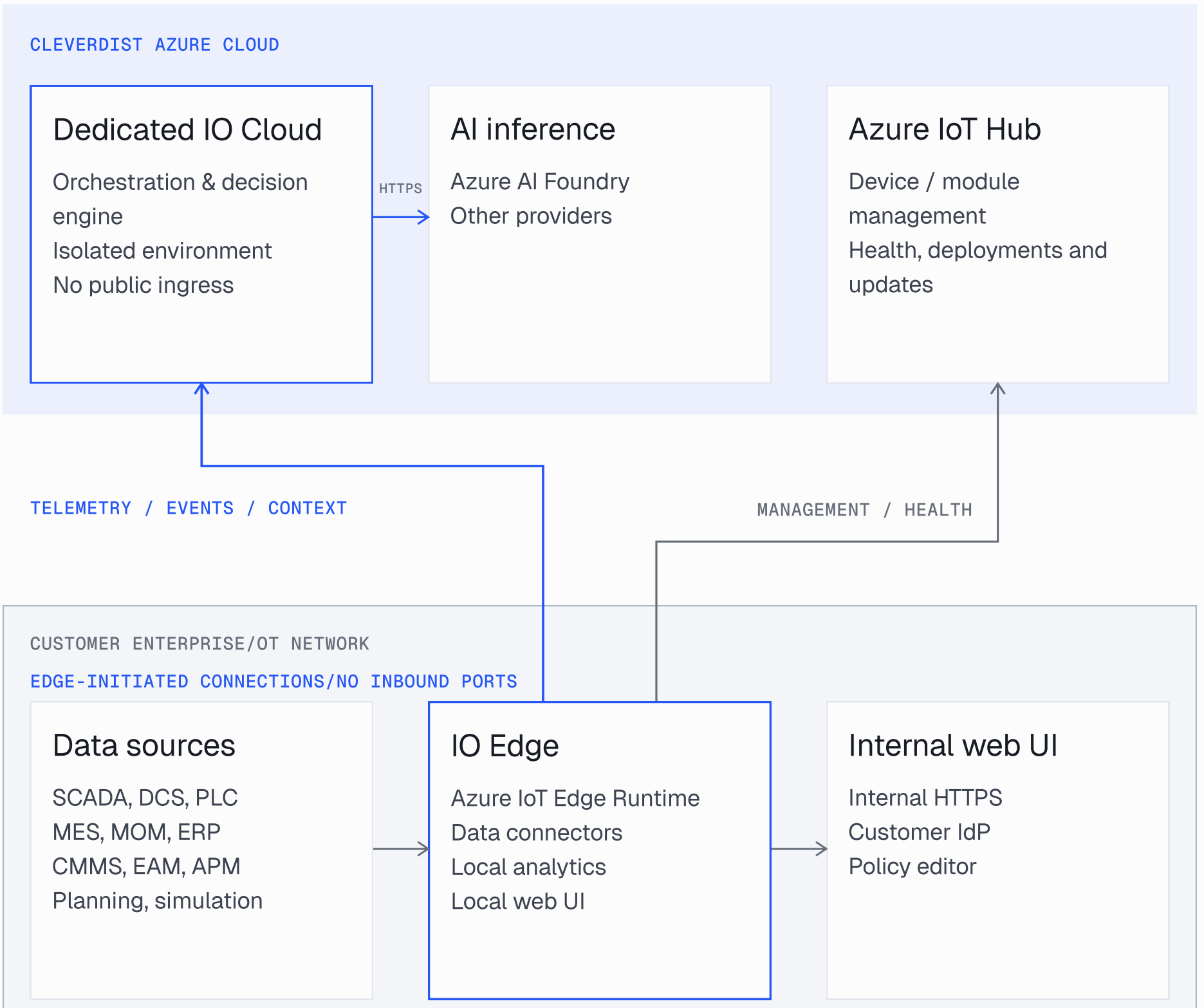
IO proposes, your team decides · No rip-and-replace

CONNECT → MODEL → REASON → ACT

03 / SECURE EDGE-TO-CLOUD ARCHITECTURE

Local integration.
Dedicated cloud reasoning.

The published architecture separates the customer network, IO Edge, a dedicated customer cloud instance and AI inference services.



Customer-side connections originate at the edge. The user interface remains inside the customer network.

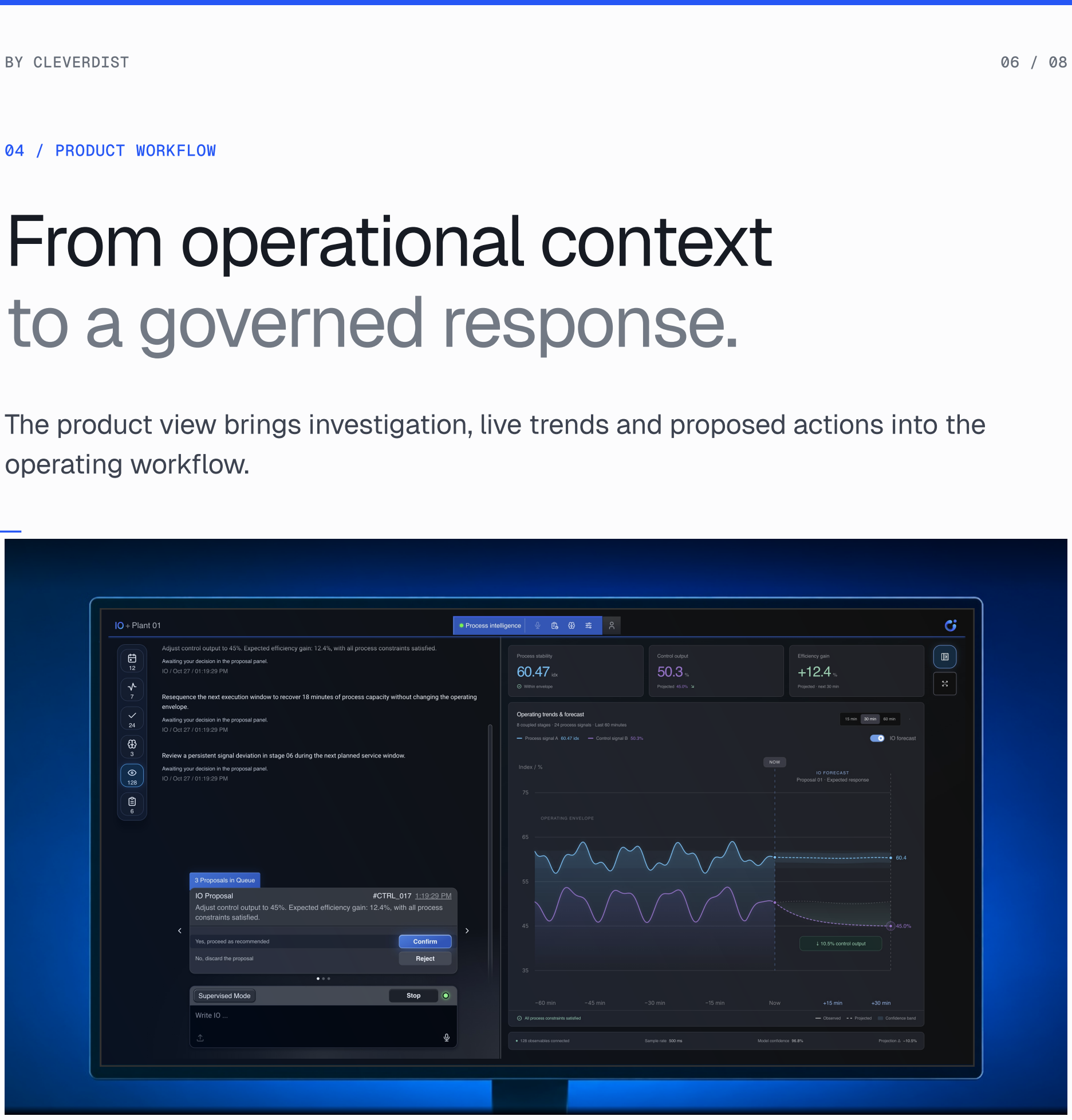
Reference: IO Secure Edge-to-Cloud Architecture ↗

ARCHITECTURE → GOVERNANCE

04 / PRODUCT WORKFLOW

From operational context to a governed response.

The product view brings investigation, live trends and proposed actions into the operating workflow.



ILLUSTRATIVE PRODUCT VIEW

01

Inspect the context.

Review operational trends alongside investigation and tool activity. Connect the signals to the current mission.

02

Review the proposed response.

Assess the recommendation and available plan context before deciding whether it should proceed.

03

Validate the action.

Confirm or reject the proposal. Delegated execution remains subject to the permissions and policies defined for the mission.

Product illustration with example values; not a customer outcome.

CONTEXT → PROPOSAL → APPROVAL

05 / MANUFACTURING & ENERGY MISSIONS

Reason ahead.
Act while there is time.

Give IO a concrete operational objective. It continuously brings changing signals, constraints and available actions back to that mission.

DISCRETE MANUFACTURING

Recover hidden capacity.

Reason across machine state, work orders and priorities to address waiting time, sequencing friction and setup constraints.

Catch process drift.

Connect process conditions, material behaviour and quality signals to identify risky trajectories before losses accumulate.

Recover line speed.

Apply expert quality reasoning continuously across speed, changeovers and process conditions when recurring issues constrain production.

ENERGY OPERATIONS

Strengthen readiness.

Reason across asset condition, field work, staffing and operating limits before peaks, storms or outage recovery.

Protect the dispatch window.

Follow forecast changes, storage position, commitments and flexible assets to prepare adjustments before the response window closes.

Orchestrate flexibility.

Coordinate batteries, controllable loads and local generation against operating constraints before avoidable cost or risk accumulates.

Define the perimeter, authorised actions and baseline for each mission. Measure changes in capacity, throughput, quality, readiness, response time or energy performance.

Mission examples describe operational objectives; scope and capability are validated for each deployment.

CONTINUOUS CONTEXT → GOVERNED RESPONSE

06 / MISSION VALIDATION & GOVERNANCE

Define the action.
Validate the boundary.

Deploy around an operational problem with a clear information perimeter, decision scope and measurable outcome.

OBSERVE

Monitor and investigate within the agreed perimeter.

RECOMMEND

Present the response and supporting context for human validation.

OPERATE

Execute where explicitly authorised by customer policies.





ILLUSTRATIVE INDUSTRIAL SCENES / MAINTENANCE AND ENERGY

01

Specify the mission

Identify the problem, information sources, constraints, available actions and escalation criteria with operational experts.

02

Assess the environment

Review system interfaces, data meaning, access permissions and approval requirements for the mission.

03

Test the decision

Review recommendations and authorised actions against expert criteria and the operating workflow.

04

Measure the outcome

Compare investigation time, asset utilisation, readiness or energy performance with the agreed baseline.

Deployment context: a flexible multi-machine manufacturing setup for sales and operations teams; Naturgy energy operations across gas-turbine and combined-cycle sites. Validate mission-specific results against the agreed baseline.

LIVE CONTEXT · CONTINUOUS REASONING

Design the mission with the operation.

cleverdist.com ↗

Industrial scenes: AI-generated illustrations and do not depict actual customers or deployments.