IO Industrial Operator

TECHNICAL OVERVIEW / AUTONOMOUS INDUSTRIAL AI

Industrial Operator (IO)

Continuous reasoning. Live operations.

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



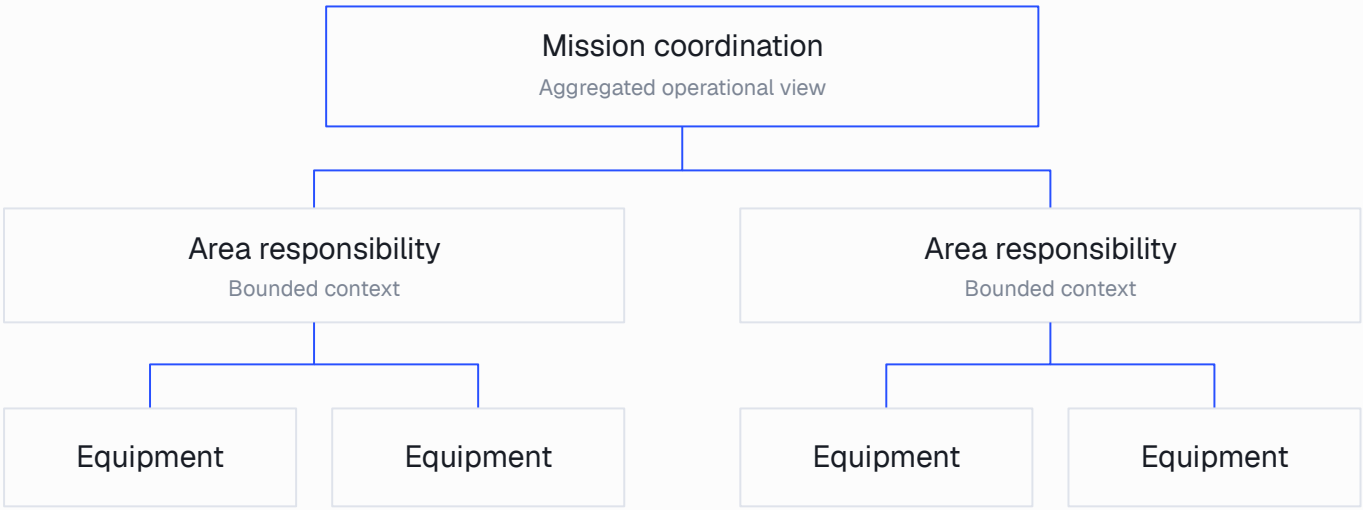
Connected to your systems. Governed by your rules.

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

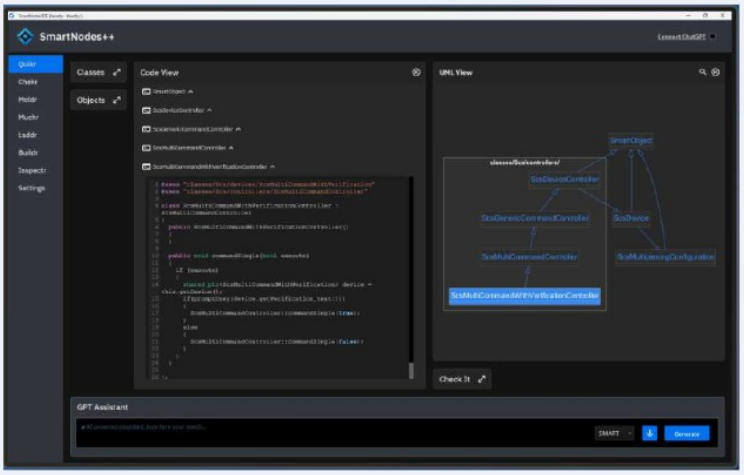
The technical note describes SmartNodes++ and WinCC OA Plant Models, a WinCC OA event plane and Python orchestration.

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

02 / SMARTNODES++ ENGINEERING ENVIRONMENT

Model the system.
Manage its lifecycle.

SmartNodes++ provides a modular WinCC OA engineering environment. The IO technical note also describes SmartNodes++ and WinCC OA Plant Models as part of its industrial foundation.



SMARTNODES++ ENGINEERING INTERFACE

Development & logic modelling

Six specialised modules support SCADA development. Code and UML views help engineers work with classes, objects and IT/OT control logic.

Mass configuration

Flexible templates support bulk configuration for brownfield and greenfield projects, helping engineers apply repeatable structures across assets.

Integration & lifecycle

WinCC OA integration, deployment management and upgrade workflows support control-system maintenance across the project lifecycle.

AI-assisted engineering

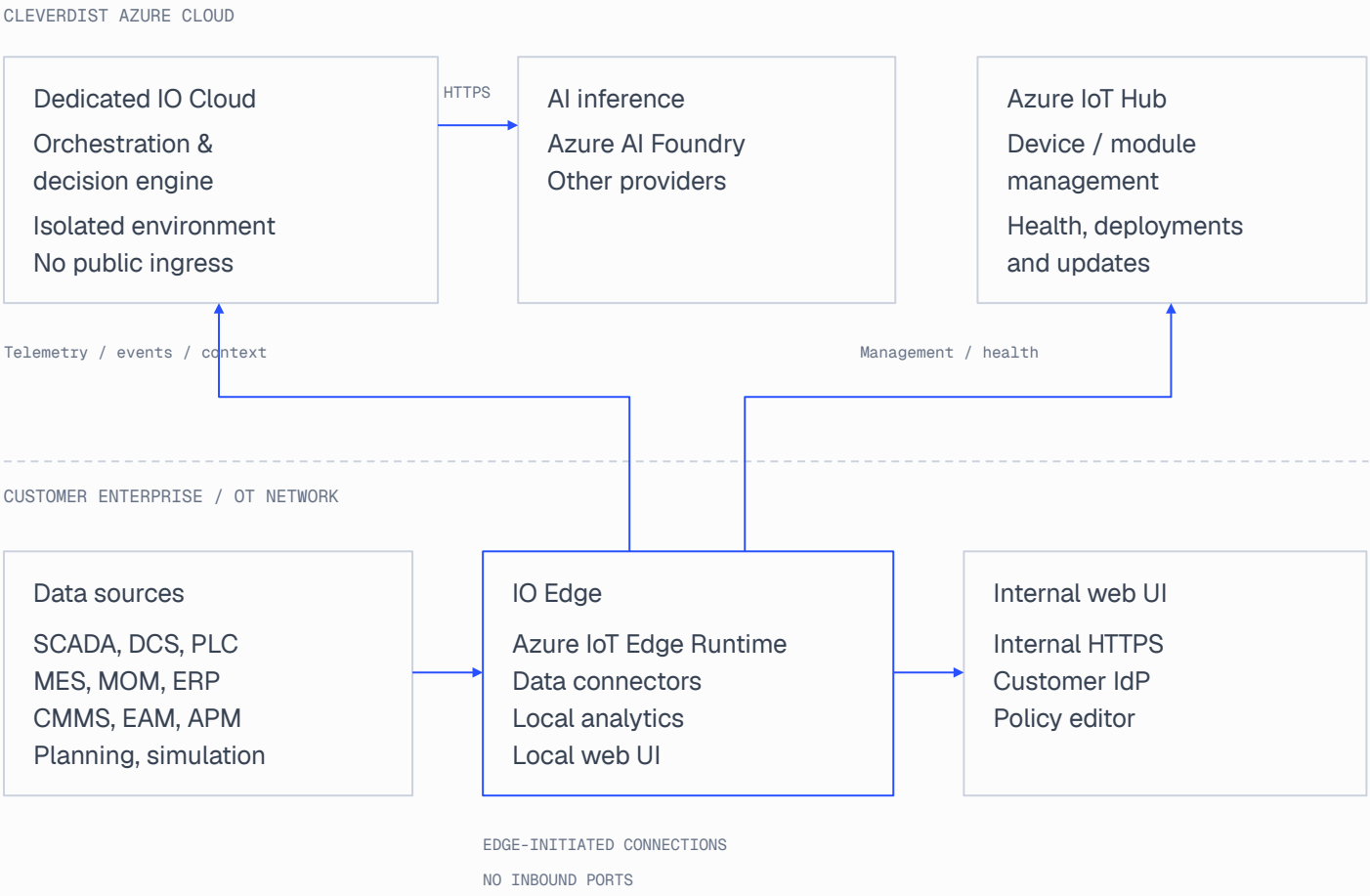
The supplied flyer shows an integrated GPT assistant in the engineering interface and illustrates AI-assisted control-room workflows.

From engineering to live reasoning. SmartNodes++ provides engineering and modelling capabilities; IO adds standing missions, persistent context and governed responses. The IO architecture on the next page describes deployment boundaries.

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.



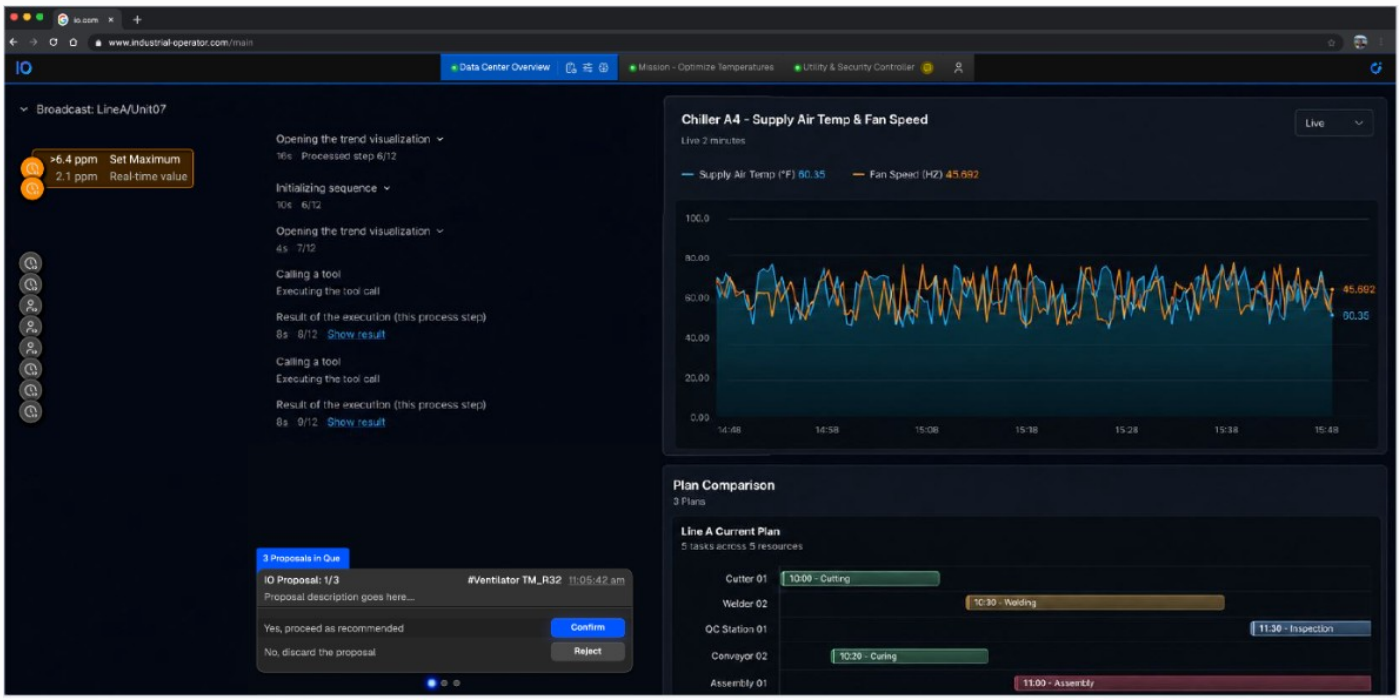
Customer-side connections originate at the edge. The user interface remains inside the customer network.

Reference: IO Secure Edge-to-Cloud Architecture ↗

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.**

The example includes Confirm and Reject controls. Delegated execution remains subject to the permissions and policies defined for the mission.

> This is a product illustration with example values and placeholder content, rather than evidence of a customer outcome.

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.

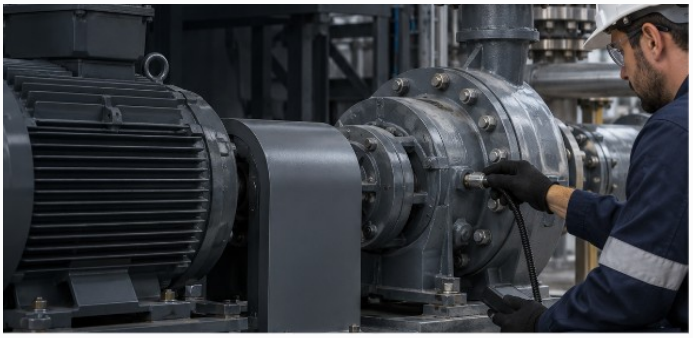
> Define the perimeter, authorised actions and baseline for each mission. Measure changes in capacity, throughput, quality, readiness, response time or energy performance.

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

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.





ILLUSTRATIVE INDUSTRIAL SCENES / MAINTENANCE AND ENERGY

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.

Specify the mission

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

Assess the environment

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

Test the decision

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

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.

Design the mission with the operation.

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