



Your P&IDs already run your plant

Now they can finally speak

A partnership brief for engineering, operations, maintenance,
and enterprise data leaders



EXECUTIVE SUMMARY

Industrial sites do not lack data. They lack connected context. Critical knowledge is spread across P&IDs, ERP, (OT) Historians, document repositories, inspections, operator logs, and informal spreadsheets. When teams need answers, the engineering drawing is still the starting point, but it is rarely connected to the systems that hold the answer.

PNID.IO and Acuvate together solve this. PNID.IO turns this P&ID into a live, clickable intelligence layer. Acuvate brings all required data sources through **AcuPrism (Enterprise Data & AI Platform)**, edge intelligence through **AcuNow**, and the data & AI engineering needed to connect these sources behind the drawing.

For Engineering	For Operations	For Maintenance
A trusted drawing-led workspace for tags, lines, documents, changes, validation, and connected asset context.	A practical interface to see live values, ask questions, understand upstream and downstream impact, and act faster.	A direct route from asset to history, work orders, manuals, spares, inspection evidence, and AI-guided next steps.

THE OPENING

Every energy and manufacturing site runs on many P&IDs. Yet when a pump fails, a valve misbehaves, a line is modified, or a safety review begins, your best people still spend too much time searching across folders, PDFs, systems, and people.

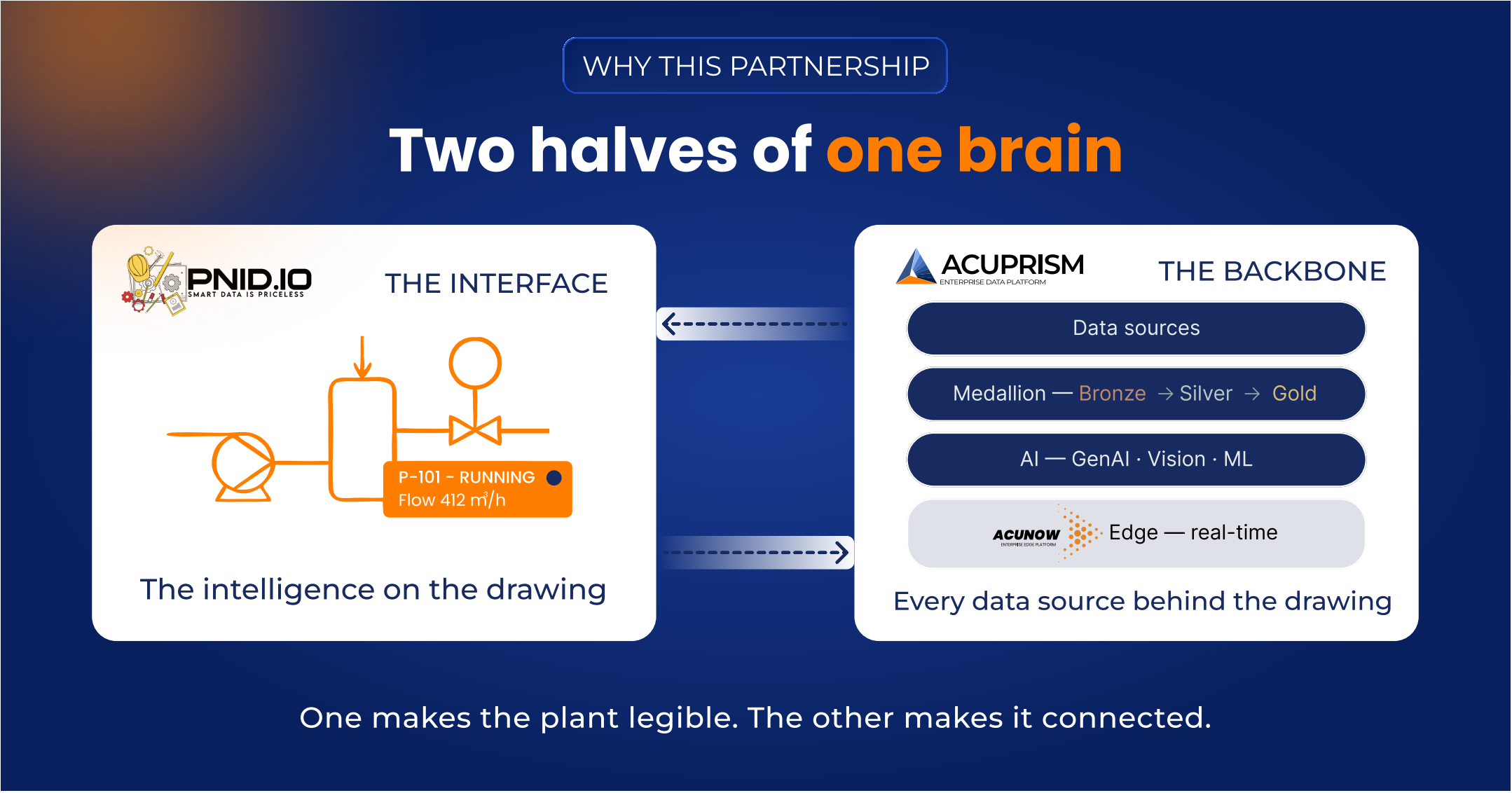
The information exists. It is just trapped and scattered across ERP systems, (OT) historians, EDMS, O365 SharePoint, inspection files, maintenance records, and tag registries that are not always aligned with the latest plant reality.

The next step is not another dashboard. The next step is to make the drawing itself intelligent: connected to the systems of record, aware of plant relationships, continuously validated, and useful to the people who make decisions every day.



A physical P&ID, now connected and intelligent. The future of plant operation, visible.

WHY THIS PARTNERSHIP — TWO HALVES OF ONE BRAIN



PNID.IO Is The Intelligence On The Drawing: The Interface Where Plant Context Becomes Visible, Navigable, And Actionable.



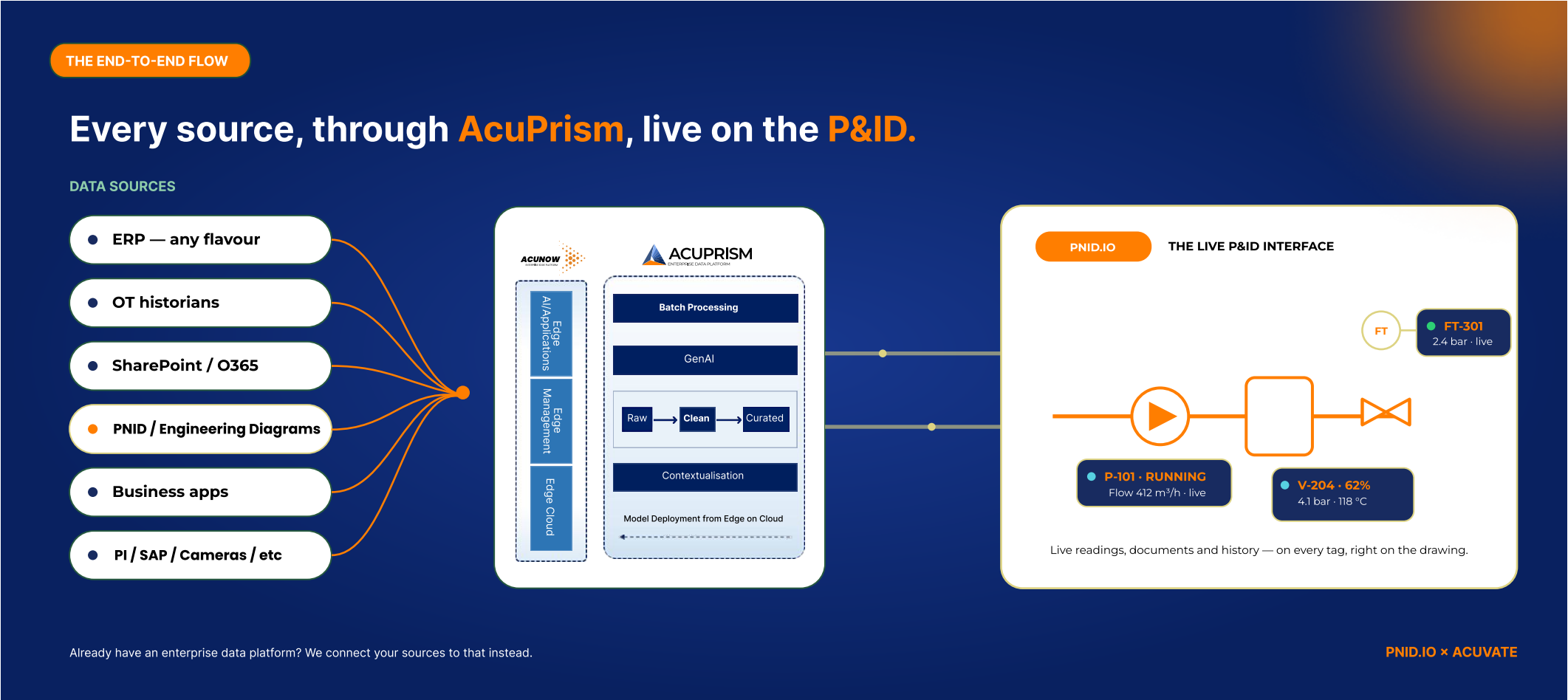
AcuPrism, Acuvate’s Enterprise Data & AI Platform, Is The Backbone: Unifying, Cleansing, Contextualizing, Governing, And Serving The Data Sources Behind The Drawing.



AcuNow Extends The Model To The Edge For Real-Time Operational Signals, Machine Vision, And Low-Latency Decisions Close To The Source.

One Makes The Plant Legible. The Other Makes It Connected. Together, They Close The Loop From Raw Data To Real Decisions.

THE END-TO-END FLOW



It starts with the business problem, not the technology. A reliability issue, safety case, shutdown preparation, data quality gap, or MOC workflow determines which data sources matter first

ERP and EAM — equipment, functional locations, work orders, spare parts, task lists, and maintenance history

OT time-series and historians — live values, trends, alarms, operating envelopes, and condition signals

Isometric Drawings

PFD/MSD

P&IDs: Piping & Instrumentation Diagrams

Document repositories — SharePoint, O365, manuals, datasheets, reports, inspection packs, operator logs, and procedures

Business applications — production, energy, reliability, quality, and HSSE systems

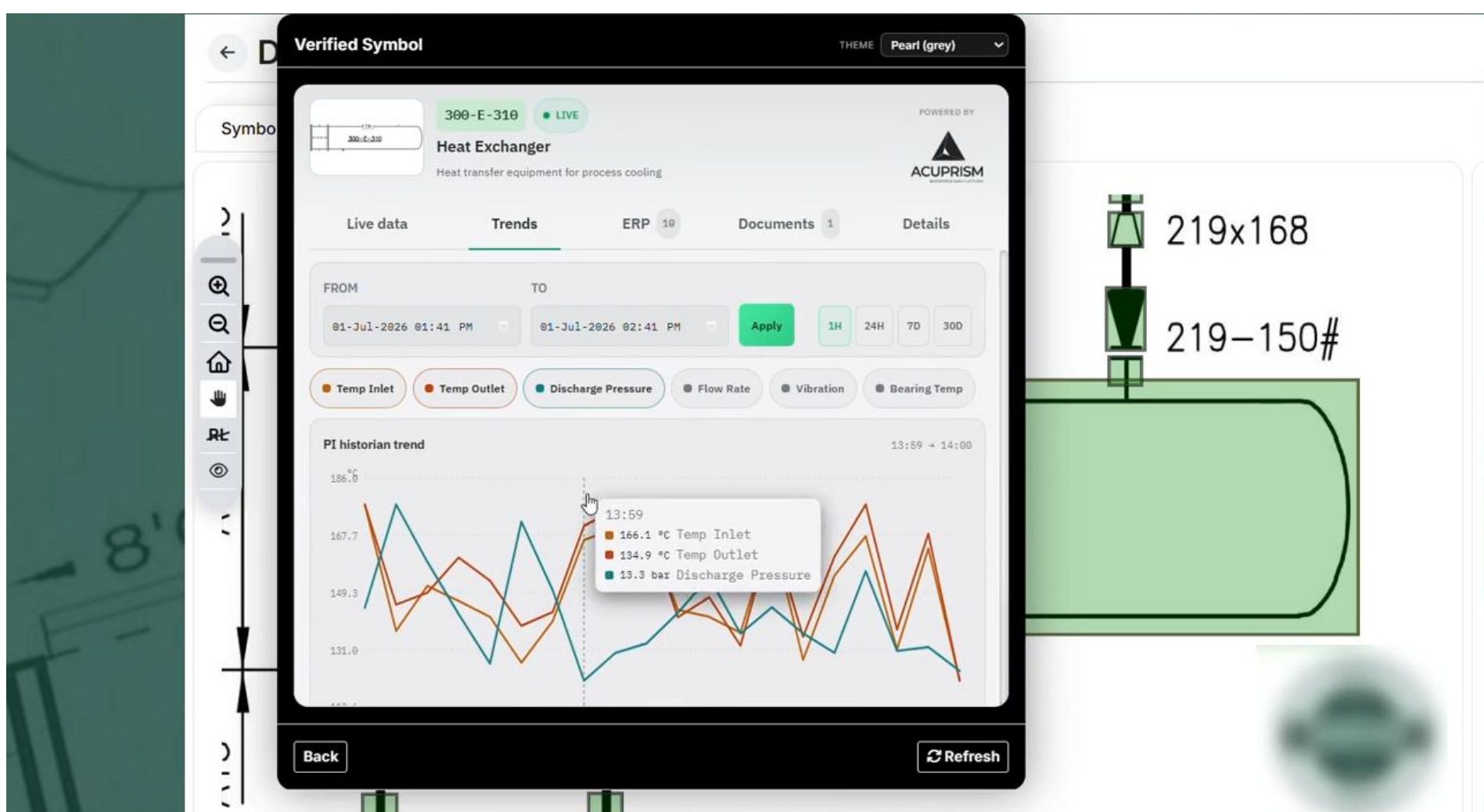
Camera and vision feeds — safety compliance, anomaly detection, quality inspection, and visual verification

These sources connect into **AcuPrism** (Enterprise Data & AI Platform) or the customer's existing enterprise data platform. Data is structured, contextualized, governed, and made ready for analytics, AI, and operational consumption. **PNID.IO** then presents the connected intelligence directly on the P&ID drawing, so users do not need to leave the engineering context to understand the plant.

When decisions need to happen near the asset, **AcuNow** brings real-time data processing and AI to the edge. This is especially relevant for high-throughput sensor streams, machine vision, safety monitoring, and low-latency operational action.

WHAT YOUR SMART P&ID & ACUPRISM CAN DO

Every interface is bidirectional: the drawing can display live intelligence, and the user can trigger workflows, validations, searches, and decisions from the drawing.





2D Digital Twin Interface

Your P&ID becomes the live workspace. Click any asset for real-time values, linked documents, inspection history, work orders, operating context, and AI insights right on the drawing.



Intelligent P&ID Digitization

Every tag, line, valve, instrument, equipment item, and relationship is extracted from PDF, PNG, DWG, or other drawing formats into structured, queryable engineering data.



Engineering Knowledge Graph

Assets are connected upstream and downstream: equipment to instruments, lines to loops, documents to tags, and systems to the actual plant relationships engineers depend on.



Contextual Data Layer

ERP, historian, document, inspection, and operational data can be mapped to the same asset context, reducing duplicate records and eliminating disconnected views of the plant.



ERP MASTER DATA SYNC	Clean, deduplicated, hierarchy-aware tag and equipment registers can be prepared for ERP, EAM, CMMS, or DiagramIQ workflows.
NATURAL LANGUAGE QUERYING	Ask questions in plain English: “What feeds into E-204?” “Which valves are on this line?” “Show the last inspection evidence for this pump.” Answers are grounded in connected engineering context.
CHANGE DETECTION & MOC	Revision comparison, downstream impact analysis, exception lists, and Management of Change packs can be assembled from the drawing and its connected data.
VALIDATION & COMPLIANCE	Rules can be configured around owner-operator standards, project requirements, naming conventions, mandatory attributes, data completeness, and engineering quality checks.

MULTI-FORMAT OUTPUT	DEXPI 2.0, Excel, JSON, DXF, and PNID outputs can support downstream engineering, data migration, integration, and design-tool workflows.
MTO & BILL OF QUANTITIES	Material take-off and bill of quantities outputs can be generated from validated drawings and structured engineering objects.
ENRICHED ASSET INSIGHTS	ML, machine vision, and Gen-AI outputs can be surfaced directly onto the P&ID, where engineers, operators, and maintenance teams already make decisions.

HIGH-VALUE USE CASES

1

Reliability & Troubleshooting

Start from a failed asset, trace upstream & downstream dependencies, view live historian values, & pull work history without switching systems.

2

Turnaround & Shutdown Readiness

Use the drawing as a validated control layer for scope, isolation points, materials, asset data, document packs, and change readiness.

3

Master Data Quality

Convert legacy drawings into structured asset registers, reconcile tags with ERP, and identify duplicates, missing attributes, or broken relationships.

4

Safety & Compliance

Connect P&IDs to procedures, HSSE evidence, line-of-fire context, inspection records, and rule-based validation checks.

5

MOC & Revision Control

Compare revisions, detect what changed, identify downstream impact, and package evidence for review and approval.

6

AI Assistant for Plant Teams

Ask asset, line, document, and operations questions from the drawing and receive context-aware answers grounded in approved data sources.

HOW TEAMS EXPERIENCE THE PLATFORM

ENGINEER

“Show Me Every Instrument Connected To This Line, The Latest Revision, Missing Attributes, And The Documents Linked To This Asset.” The System Responds Through The Drawing, Not Through Disconnected Search Results.

OPERATOR

“What Is Feeding This Vessel Right Now, What Changed Since The Previous Shift, And Which Values Are Outside The Normal Range?” Live Operational Context Appears Where The Operator Understands The Process: On The P&ID.

MAINTENANCE PLANNER

“Pull The Work Order, Isolation Points, Spares, Inspection Evidence, And Manual For This Pump.” The Planner Moves From Asset To Action Without Manually Reconciling Five Systems.

IMPLEMENTATION MODEL

The recommended approach is practical: prove value on a focused set of drawings and systems, then expand by site, unit, workflow, or asset class. The goal is not a long transformation programme. The goal is a visible, usable, governed operating layer that teams can trust.

Phase	Focus	What happens in this phase
Phase 1	Align & Build	Build master asset register from drawings and PI & other systems
Phase 2	Digitize & Connect	Testing API's reference table plus digitized P&IDs connected to PI and SAP
Phase 3	Integrate & Activate	Live data surfaced on the PNID.IO drawing via API streaming from Acuprism
Phase 4	Deploy & Scale	Client views live data at a click; then scale out.

The first rollout should focus on a **business outcome**, not only data conversion. Strong starting points include reliability investigations, turnaround readiness, ERP master data quality, MOC acceleration, or live asset intelligence for a critical unit.

GOVERNANCE, SECURITY AND ENTERPRISE FIT

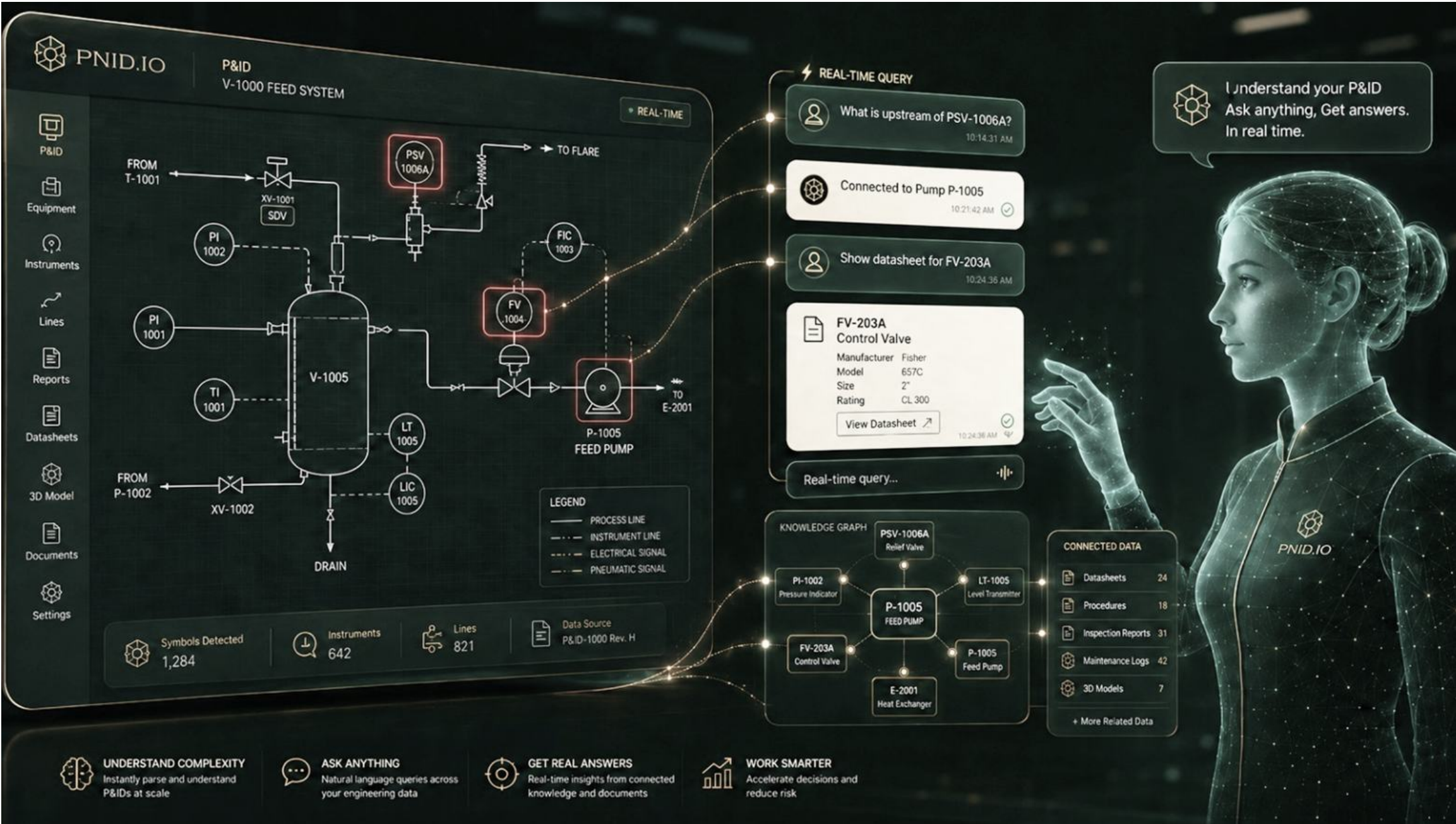
System-Of-Record Respect — PNID.IO Does Not Replace ERP, Historians, EDMS, Or Enterprise Data Platforms. It Makes Their Data Usable In Engineering Context.

Data Ownership Clarity — Business Owners Can Define Which Source Is Authoritative For Tags, Documents, Equipment, Live Values, And Maintenance Records.

Human-In-The-Loop Validation — AI Accelerates Extraction, Matching, And Insight Generation, While Engineering Review Remains Available For Exceptions And Approval Flows.

Scalable Architecture — The Model Can Start With A Limited Drawing Set And Expand Across Units, Plants, And Regions As Governance And Usage Mature.

WHAT'S NEXT



The next layer is **agentic plant intelligence**: assistants that act through the P&ID interface, surface the right ERP work order, retrieve the exact maintenance document, detect the impact of a drawing revision, and propose advisory setpoints for operators to approve.

The drawing stops being a static reference. It becomes the **operational front door** to the plant's data, workflows, and decisions.

THE BOTTOM LINE

You do not need to rip out existing systems. You do not need to wait years for a full digital twin programme. You need your existing drawings to connect to the systems you already own, stay current, and become useful at the exact point where work happens.

That is what PNID.IO and Acuvate deliver together: the engineering interface, the enterprise data backbone, and the intelligence layer that turns drawings into live plant context.



PNID.IO

x

acuvate[®]
... where Acumen drives Innovation

PNID.IO x Acuvate — Where the drawing
becomes the database.

One **partnership**. One **accountable** experience.

PNID.IO and Acuvate are fully committed to delivering this as a seamless, integrated experience — not two disconnected products, but a single end-to-end solution you can rely on. From deployment to daily operations, from data ingestion to AI-enriched digital twin insights, you get maximum business value, minimum complexity.

Ready to explore what an end-to-end digital
twin solution can do for your operations?

Contact: advisors@acuvate.com | support@pnid.io

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