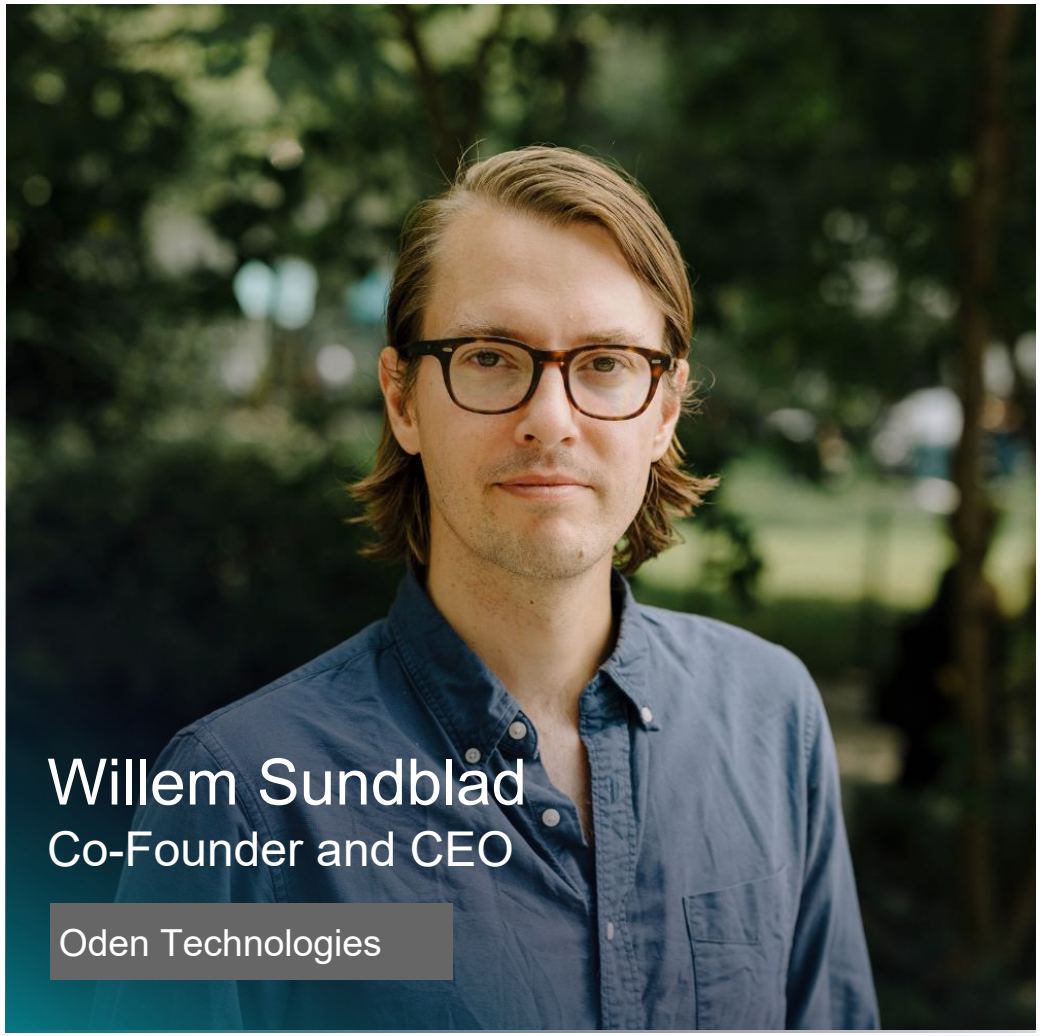
ODEN TECHNOLOGIES

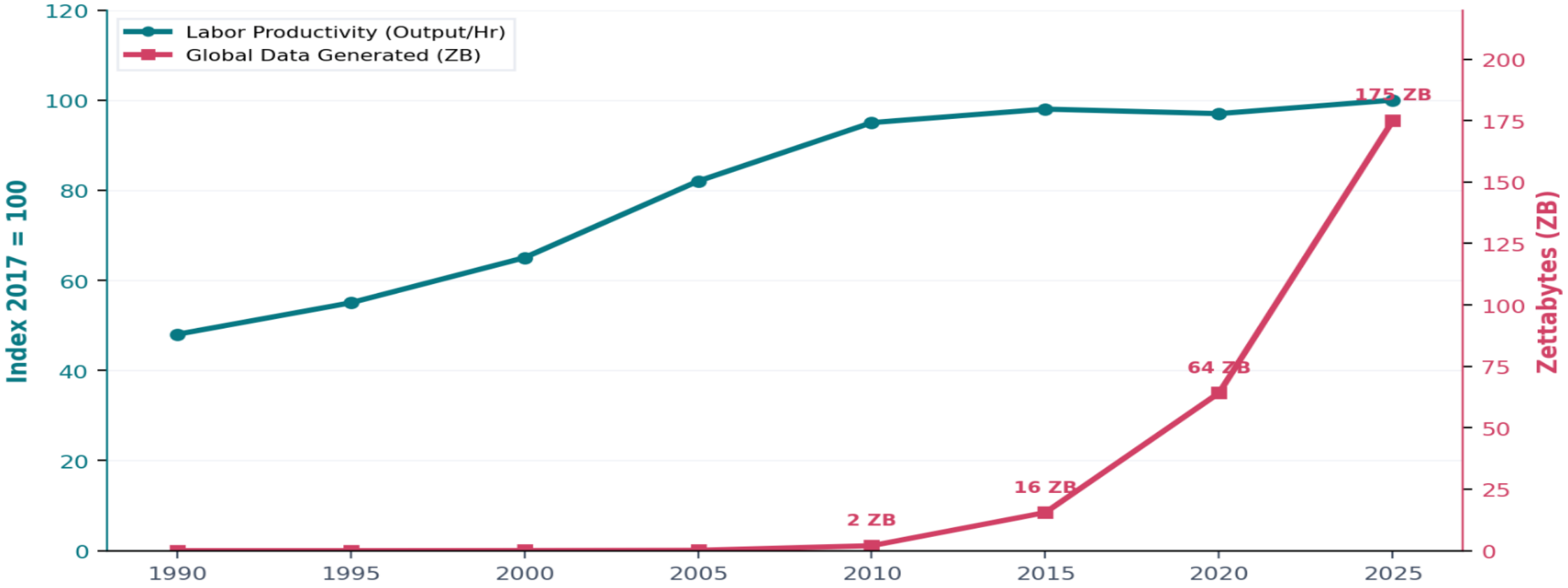
Operational AI for Manufacturing

Speaker Introduction



Labor Productivity is Flat & Data Has Exploded

Manufacturing Labor Productivity (Output/Hr) vs. Global Data Generated (ZB)



Sources: U.S. Bureau of Labor Statistics (FRED), IDC Global DataSphere, Statista, Hilbert & López (2011)

Front-Line Challenges

Skill gap between experienced operators and new hires.

Optimizing line speed and efficiency relies on gut instinct.

Historical knowledge is lost when skilled operators leave.

High front-line churn equals constant onboarding and training.

Source: LNS Research

Humans Alone Don’t Have the Capacity to Leverage Massive, Dirty Manufacturing Data

Disorganized

Siloed

Inaccurate

Stuck in the past

84%

of manufacturers are **maintaining or increasing investment** in industrial transformation (IX)

74%

of IX leaders are **investing in AI/ML**

4X

how much more likely **industry leaders are to be investing in real-time data for the front line** vs. laggards

Sources: LNS Research: Lessons from Industrial Leaders, Future of Industrial Work Roundtable

Introducing Oden

The Input

Scattered Data Silos

Existing PLCs & Sensors

Unused Historian Data

Manual Paper Logs

The Bridge

Detect

AI spots deviations as they happen.

Decide

Decision engine weighs tradeoff effects.

Deliver

Operator immediately receives specific guidance.

The Output

Predictable Excellence

The "Golden Run" on every shift.

Zero Waste / Lower Scrap.

Consistent performance, regardless of operator experience.

Factory Analytics
Reporting, dashboards, operator scorecards, and root-cause analysis

Data Connect & Data Engine
Integrate data from all systems with cleansing, contextualization, and enrichment

Forge
AI assistant for all configurations, data analysis, and insight generation

Oden Operational AI Platform

Composable Capability Layers

Pattern Detection

Anomaly Detection
Pattern-based detection of abnormal process behavior

Process Optimization

Process AI
Real-time process recommendations for operators

Work Instructions

Knowledge AI
Intelligent work instructions for operators

Automation & Orchestration

Workflows
Coordinate and automate actions across people and systems

The Challenge with Detecting

Timeseries Data is not enough

➔ Whether metric behavior is normal or not is co-dependent with other variables and context / state

Integrated context from other systems is prone to misalignment

➔ Requirement to align context to increase accuracy

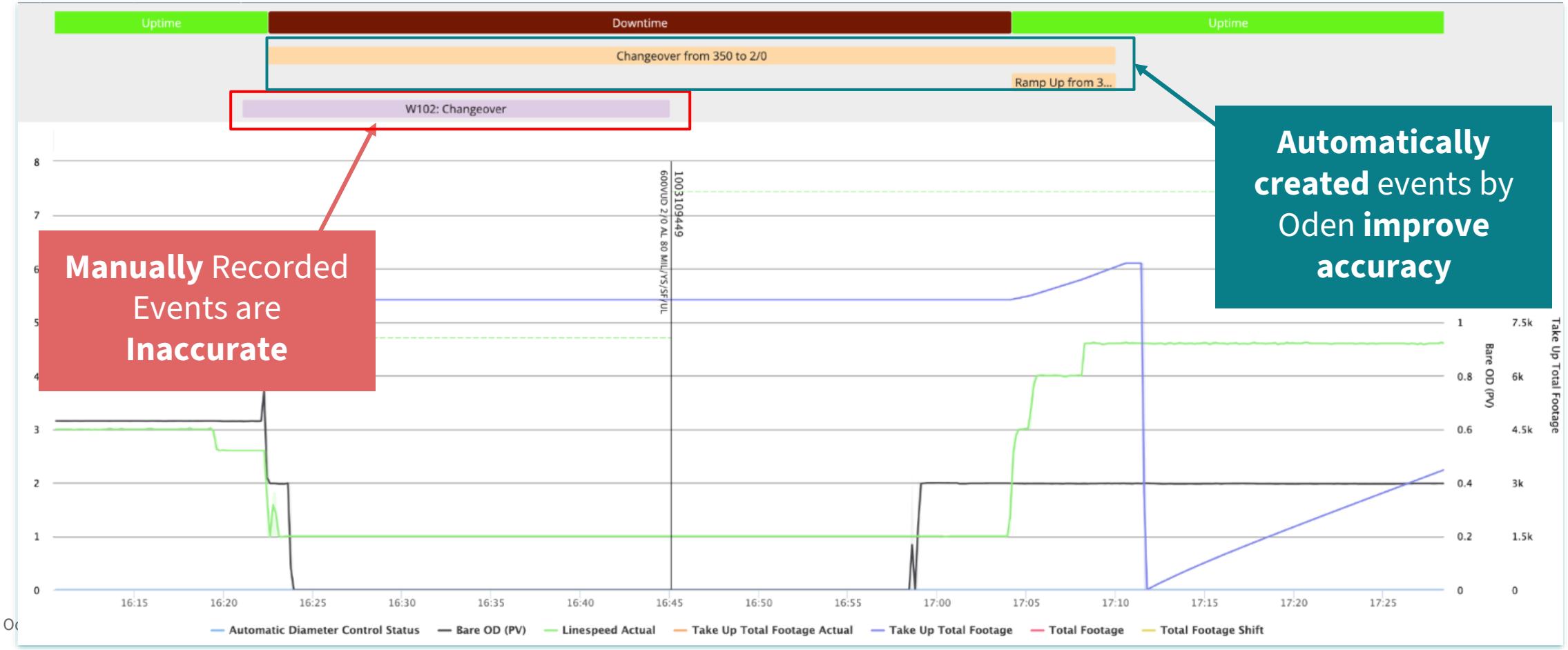
Still missing context because not everything is captured

➔ Data Labeling is critical addition to improve context, accuracy and help Operators

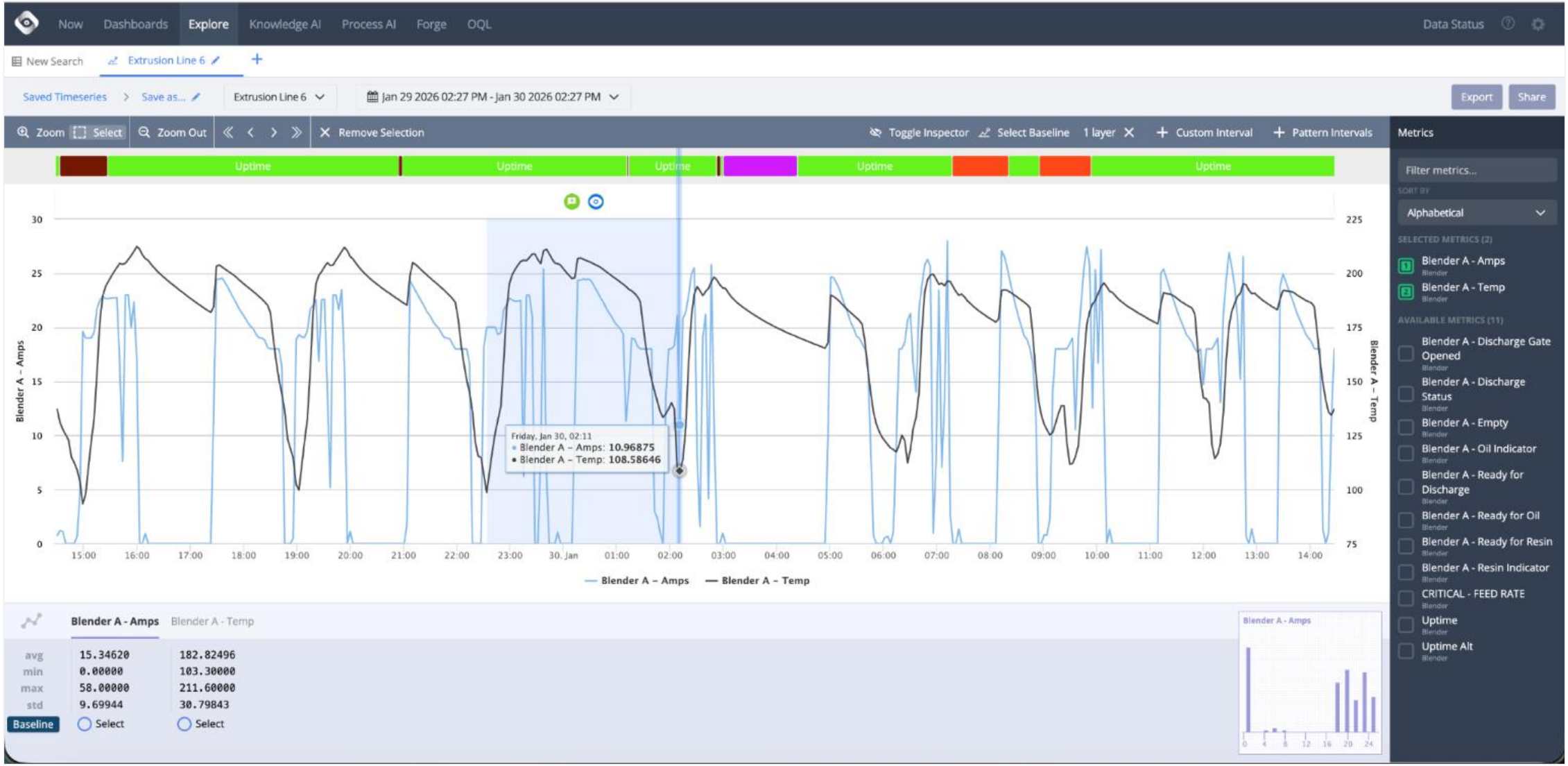
Automatic Data Labeling

Real-time data enrichment

Automated event labeling provides **high quality data** for Process AI and customer systems while **removing manual tasks**



Timeseries: Signal → Pattern (Process Engineer)



Anomaly Model → Anomaly Interval

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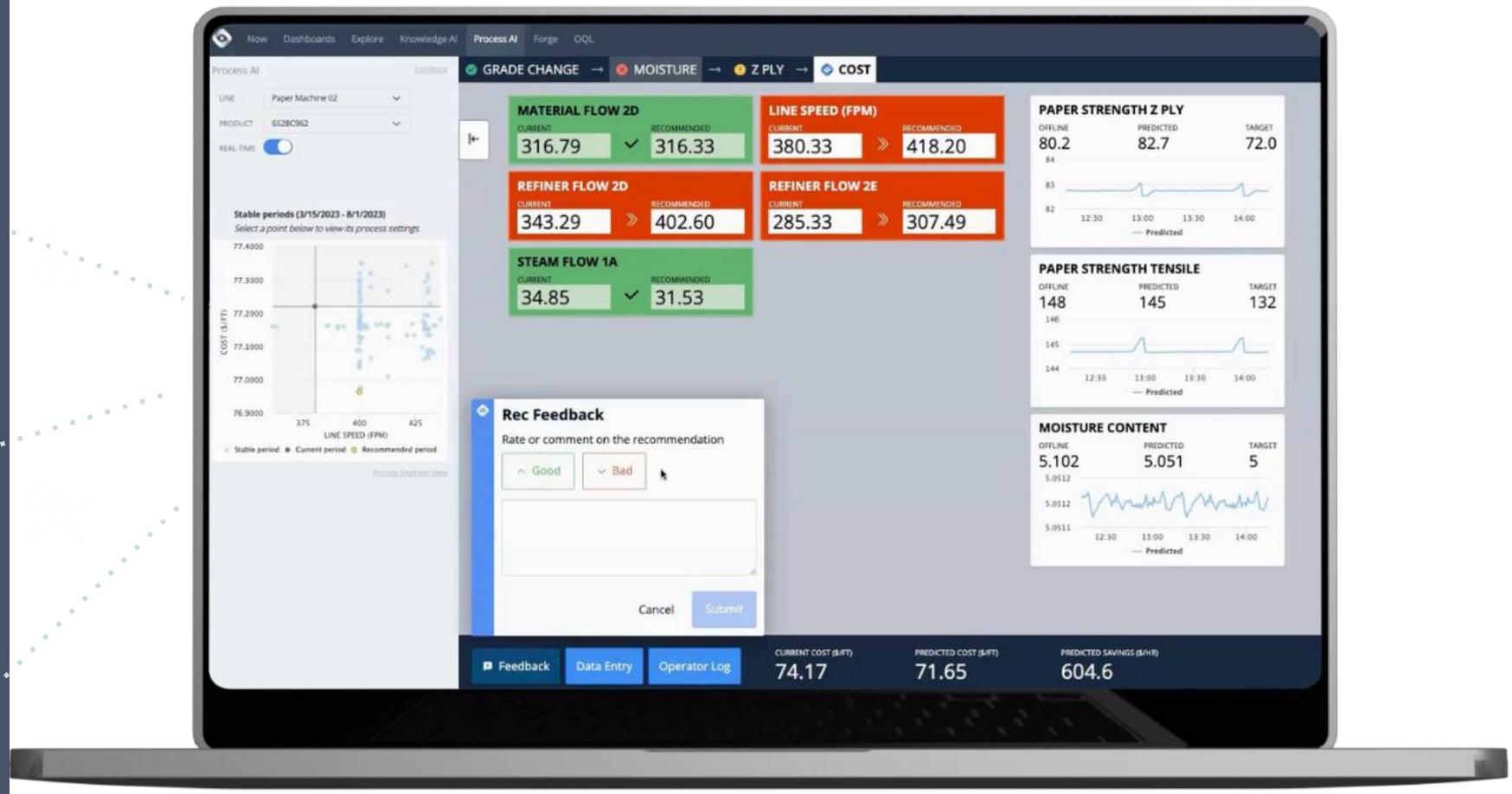
Driving Action

Front-Line Focus

Live Visibility

Dynamic Guidance

Predicted Outcomes



Anomaly Detection + Process Recommendations

Alert message “Monitor Furnish Conditions” to direct action

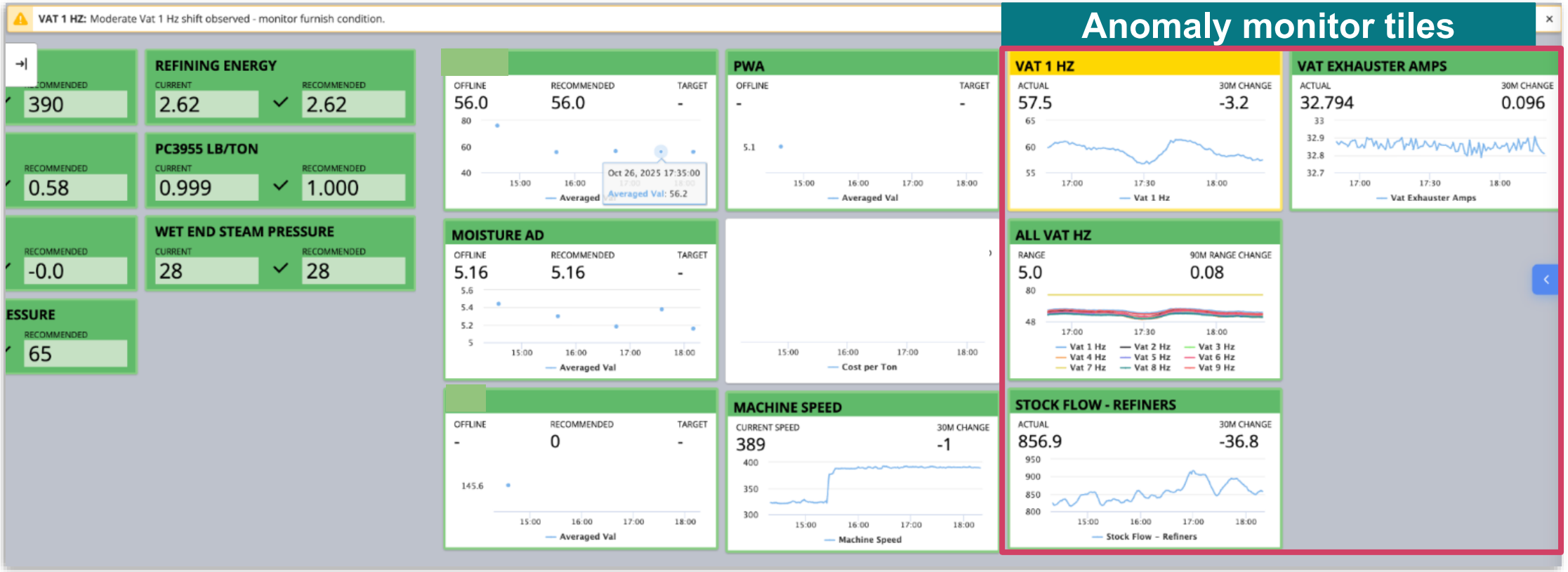
Email alerts

ALERT

Vat Hz Alarm

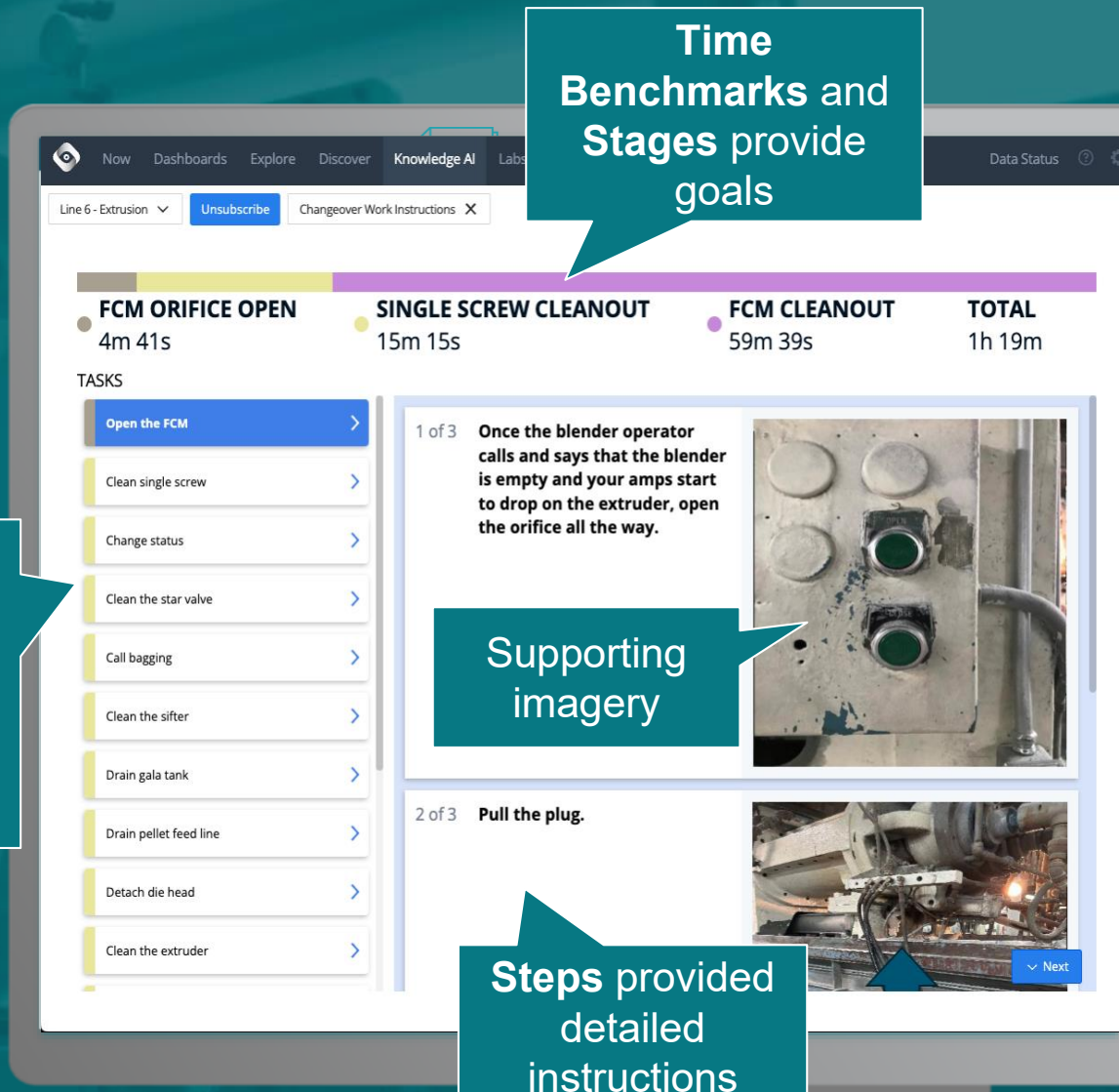
Line	Message
#1 PM	Significant Vat 1 Hz shift observed - verify furnish condition and continue to monitor.

Anomaly monitor tiles



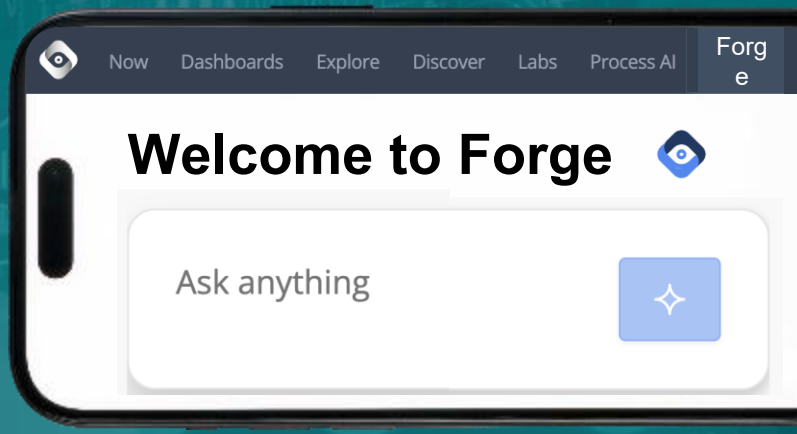
AI-Driven Work Instructions

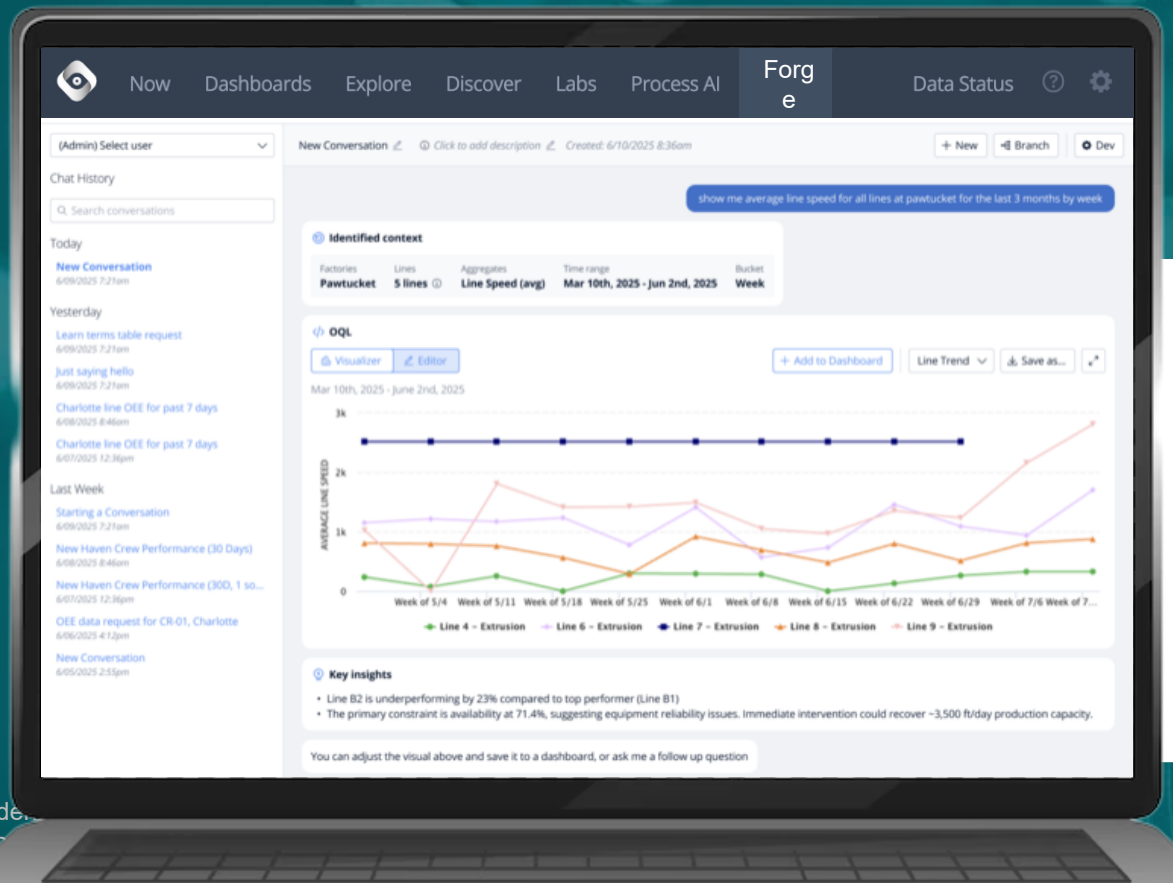
Deliver **dynamic how-to instructions to operators**, empowering anyone to have the domain knowledge of a 30-year veteran.



Forge

Agent-driven interface to perform data analysis, dashboarding, & complex data queries in seconds





Native Access

Forge is native to the Oden platform, allowing you to quickly add new analysis to existing dashboards and reports in a single click

Seamless Setup

Forge supports customer led configuration, allowing you to add new lines, recognize and label patterns, and adjust rule sets

AI is Doing More and More Work, but it's Still Early

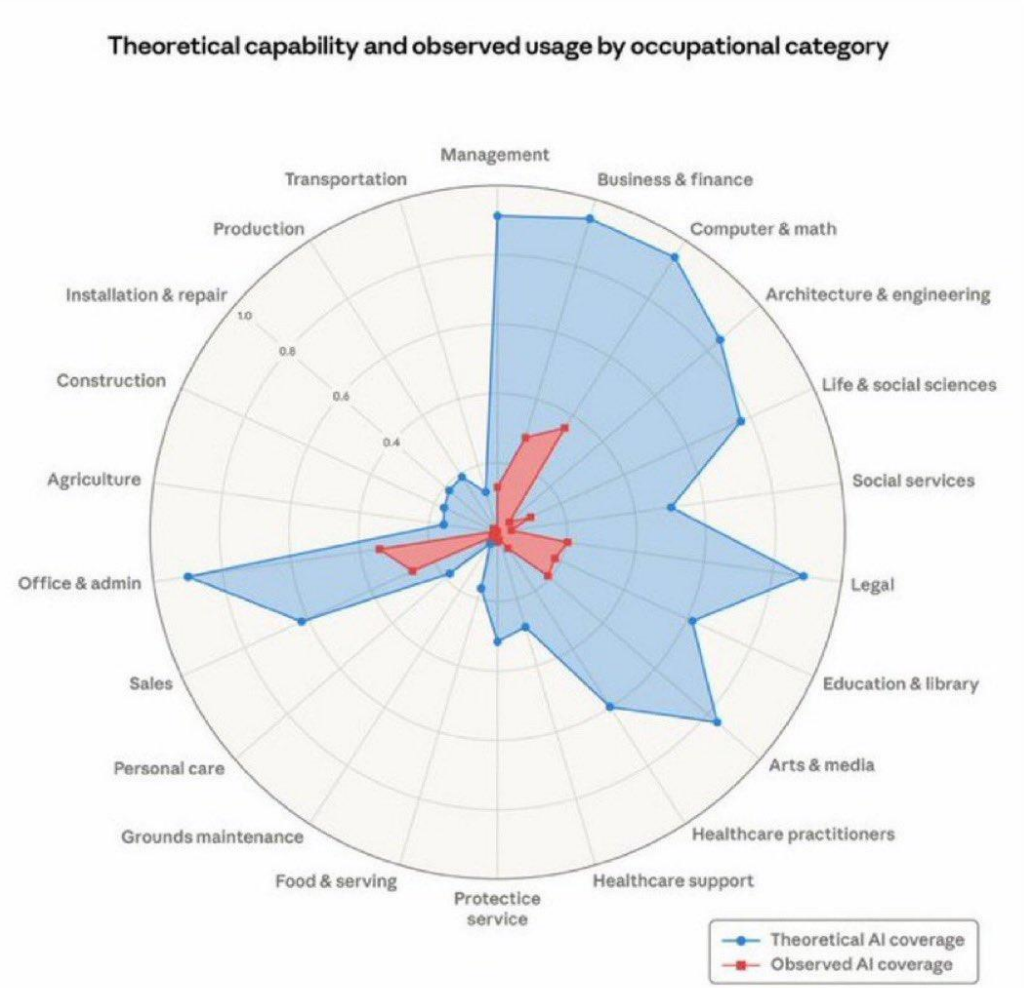


Figure 2: Theoretical capability and observed exposure by occupational category
This figure shows the share of job tasks that LLMs could theoretically perform (blue area) and our own job coverage measure derived from usage data (red area).

Where AI has been Most Impactful

Text & content generation

Writing emails, reports, marketing copy, and creative content at near-human quality

Research & analysis

Synthesizing large volumes of information, answering complex questions, summarizing documents

Software development

Writing, debugging, and reviewing code with dramatically improved developer productivity

Customer interactions

Powering chatbots, support agents, and personalized recommendations at scale

Where AI should be Impactful in Manufacturing

Root cause analysis

Rapidly diagnosing why quality issues or downtime events occurred by correlating process data

Predictive maintenance

Anticipating equipment failures before they happen using sensor data patterns and anomaly detection

Production optimization

Tuning process parameters in real time to maximize yield, throughput, and quality

Quality monitoring

Detecting deviations from spec automatically and alerting operators before defects propagate

What are the Prerequisites?

01

Real-time data platform

A robust foundation that collects, contextualizes, and streams manufacturing data from across your operations in real time

02

Streaming analytics & ML

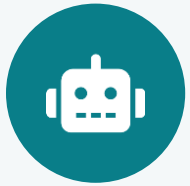
The ability to run models in real time — streaming analytics, machine learning for predictions, and anomaly detection on live data

03

Unified query layer

A purpose-built query language that lets both humans and agents access the right data without complex SQL across dozens of tables

Two Different Types of Agents



Enabling agents

Work behind the scenes to power other agents or simplify complex tasks.

Example: OQL-Writing Agent

Translates natural language into OQL queries, allowing any agent or user to retrieve the exact data needed for analysis.

User-facing agents

Interact directly with people to help complete tasks and provide guidance.

Example: Root Cause Analysis Agent

Guides a manufacturing engineer through diagnosing why a quality event occurred, pulling data and suggesting hypotheses along the way.

The OQL Advantage

100x

reduction in complexity

1,000 lines of SQL
= 10 lines of OQL

Purpose-built for time-series manufacturing data

Why this matters for agents

Fewer tokens means lower cost, faster execution, and critically fewer hallucinations when an AI agent writes queries

Enabling agent in action

The OQL-writing agent translates natural language requests into precise queries, giving any agent or user instant access to the right data

Purpose-built query language

OQL (Oden Query Language) is designed specifically for manufacturing data, making it dramatically simpler than general-purpose SQL

Giving Agents Skills & Tools

Skills

Defined capabilities an agent can perform — like root cause analysis, trend identification, or report generation

Tools

Integrations and APIs agents use to take action — querying data, creating charts, triggering alerts, sending notifications

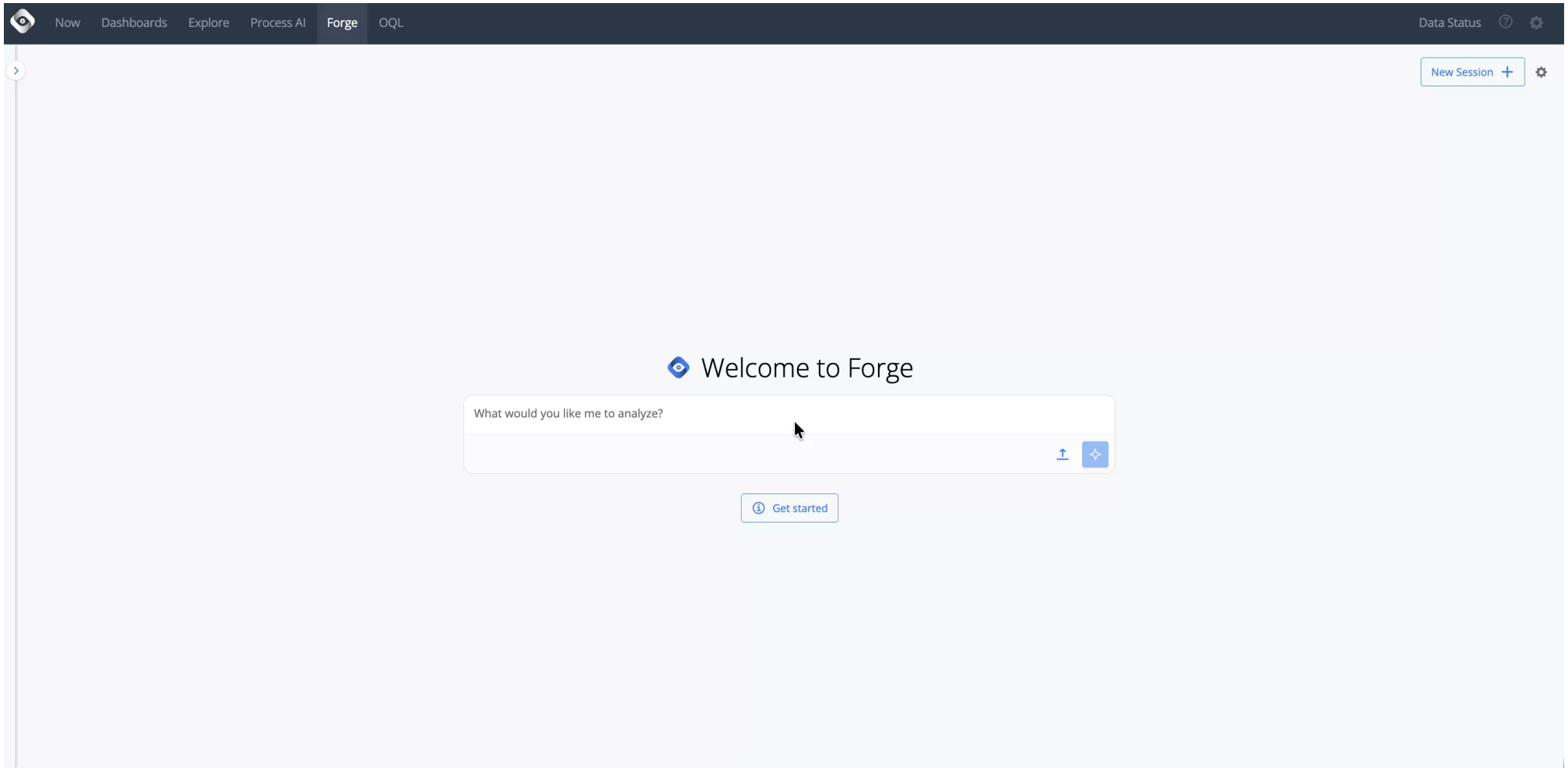
Composability

Skills and tools can be mixed and matched. A root cause agent uses the OQL tool, charting tool, and anomaly detection skill together

Compounding

Every new skill or tool added makes all agents more capable. The platform grows smarter as you build on it

RCA Agent in Action



Actions within Oden and Other Systems

Inside Oden

Create alerts, reports, dashboards, and notifications

CMMS

Create and assign work orders when issues are identified

Predictive Maintenance

Enrich root cause with vibration and condition monitoring data

Closed-loop ops

Insight leads directly to action without manual bridging

How AI in Software Will Impact Manufacturing

Software is faster and cheaper to build

AI coding assistants are dramatically accelerating development. What took weeks now takes days or hours.

More customizable software for manufacturers

As building software gets cheaper, solutions can be tailored to specific processes, lines, and plants.

Will manufacturers vibe-code everything?

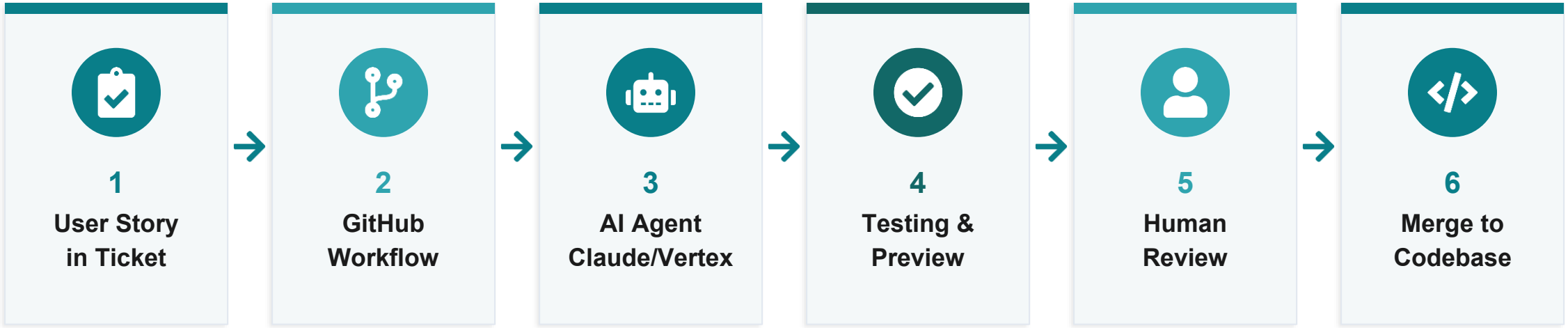
Probably not. But their solution providers will have to meet much higher expectations on speed and customization.

The bar is rising for solution providers

Manufacturers will expect vendors to ship faster, iterate more, and deliver truly fit-for-purpose tools.

Introducing Autocode

Our agentic development pipeline from user story to production code



A developer writes a user story. A GitHub workflow triggers an AI agent that writes the code, runs tests, and creates a preview deployment. A human reviews and approves before merging into the codebase.

For you
Recent
Starred
5:00
gineering
Engineering
Reporting team kanb...
ntinuous Feature Re...
_Inactive_Feedback...
erts and Anomaly En...
Delivery Experience
More spaces
Filters

CLONE - Hide Legend for univariate Timeseries in Monitor Tiles

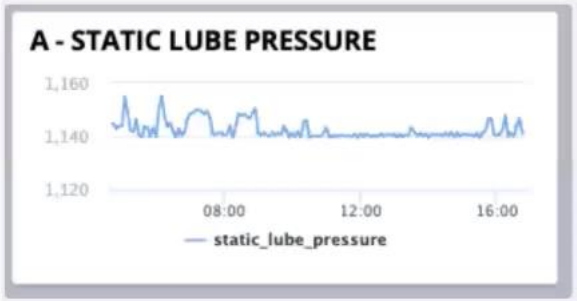
In Progress | Improve Task

Description

• Unsaved changes

Context: When real-estate is scarce on a PAI screen, and we have a univariate time series plot in a monitor tile, we do not need the legend at the bottom. That is just redundant spacing that decreases the space of the timeseries plot. Automatically disable the legend for the timeseries plot when there is only one timeseries plotted within a monitor tile.

Here's a screenshot showing the wasted real-estate due to an unneeded legend



This would improve monitor tiles by increasing y-axis size and generally decluttering PAI when text-use is heavy.

Attachments 1

Details

Assignee	DT Deepak Turaga
Parent	None
Theme	Add option
Priority	= Medium
Story Points	None
Labels	process-ai, teenie-weenie
Reporter	DT Deepak Turaga
Development	Open with VS Code 1 branch Create commit 1 pull request OPEN 9 builds

The Future of AI in Manufacturing

Agentic workflows are here

AI agents can already speed up and fully complete complex manufacturing tasks like root cause analysis — from data retrieval to recommended actions

Software will become truly customizable

As AI makes building software faster and cheaper, manufacturers will get solutions tailored to their specific operations instead of generic tools

The system of action

The combination of agentic workflows and customizable software creates a new paradigm: AI that doesn't just inform, but coordinates action across your entire operation

Production Line of the Future

Automation | AI | Change Management

Partnership Impact

+25%
OEE

24/7 to **24/5**
Production Schedule

4.7M
Lbs Added

20% to **91%**
Retention Rate

Event Overview

What

- Behind the scenes plant tour, demos, and thought leadership discussions

Why

- See Industry 4.0 & AI-driven solutions in action

Learn

- Approaches and best practices to drive change management from the plant floor to the C-Suite

April 8th and 9th | Charlotte, NC

Why Oden

Focused on the Front Line

Operators receive dynamic recommendations in the moment.

Immediate improvements happen mid-shift.

Turnkey Data Engine

Data doesn't have to be tidy or organized.

Data from all systems is unified, cleaned, and streamlined.

Time-to-Value

No more time- and resource-consuming pilots.

Deployment delivers value within 90 days.