Exl Athena

INDUSTRY BROCHURE · 2026

Physical AI for predictive maintenance & diagnostics.

IoT for Manufacturing 5.0. Decision intelligence for the machines that run a plant — on the sensors, historian and CMMS already in place.



PHYSICAL AI | PREDICTIVE MAINTENANCE | DIAGNOSTICS | IOT · MFG 5.0

For plant heads, maintenance leaders and reliability engineers

Mumbai · Chennai · Kuala Lumpur

SENSE
Vibration, temperature, pressure, current

DIAGNOSE
The fault, the cause, the time left

DECIDE
An approved work order, before the stop

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What this brochure covers

Written for the people who carry the cost when a line stops: the plant head, the maintenance manager, the reliability engineer. It starts from the failure the plant already knows, and ends with how a first engagement works.

HOW AN ENGAGEMENT STARTS

No replacement of the CMMS, historian or ERP. ExlAthena reads them, and a first engagement begins with the single asset class that costs the most when it fails.

THE PROBLEM

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03 — THE STOP THAT WAS VISIBLE FOR WEEKS

The bearing ran hot for three weeks. The line was the first to say so.

The data was in the historian the entire time. Vibration up, temperature up, current drawing more. What was missing was someone whose job was to watch all of it, on every asset, every hour.

Run to failure

The bill is the stop, the scrap, the overtime, and the part that is not in the storeroom.

Service by the calendar

Bearings changed every six months. Some had years left in them. One fails in month four.

Alarms nobody reads

Threshold alarms fire all day. After a month the team stops looking, and the real one passes with the noise.

Judgement that retires

One engineer can hear a failing bearing. That knowledge leaves the day he does.



ALREADY ON YOUR MACHINES

Vibration, temperature and current sensors are fitted. The gap is between the reading and the decision.

04 — THE MORNING MEETING

Same sensors. A different list on the table.

ExlAthena reads the signals a plant already collects and gives the maintenance lead a short list: which asset, what is failing, how long it has, and which planned shutdown to use.

Forty items become three

The shutdown list ranked by risk, not by whoever spoke last in the meeting. Each item carries its evidence.

An alarm becomes a diagnosis

"Vibration high" becomes bearing wear, ranked above the gearbox and the coupling, with the readings shown.

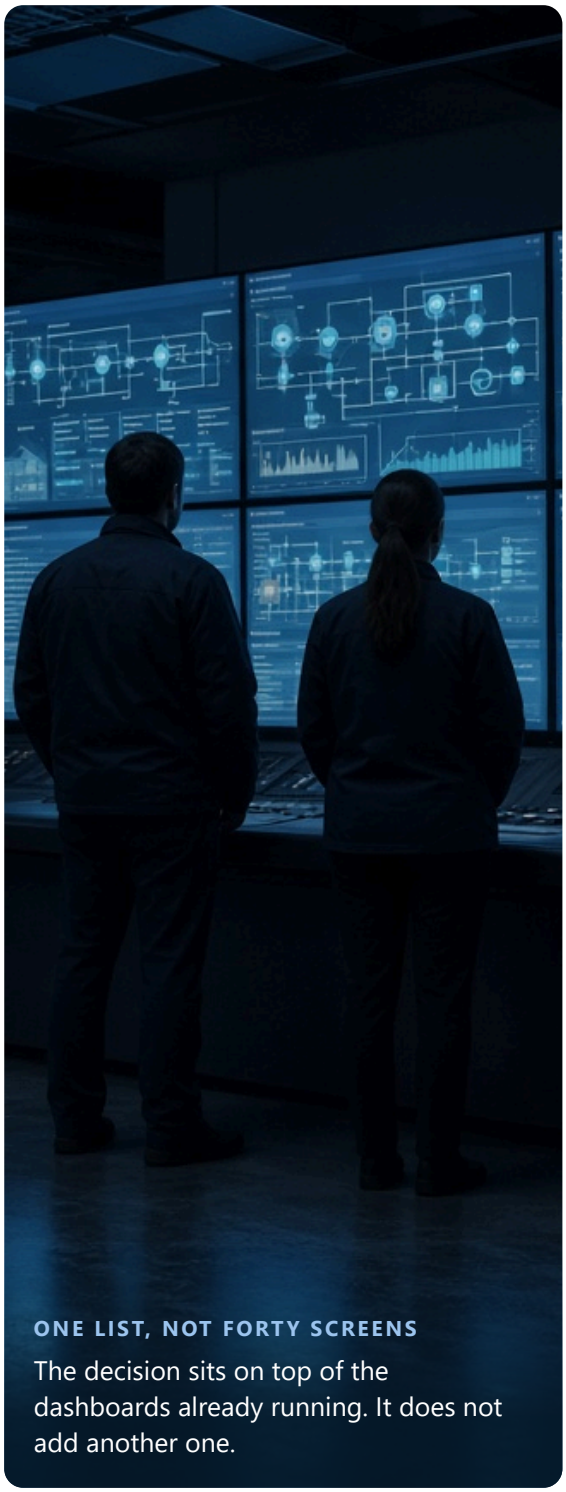
A guess becomes a range

Remaining life with an upper and a lower figure, so the safety-critical decision uses the lower one.

The work order goes out before the failure

The planner approves it. It reaches the CMMS while the part can still be ordered normally.

Nothing is automatic. The engineer sees the reasoning and can reject the recommendation. The system records who decided.



ONE LIST, NOT FORTY SCREENS

The decision sits on top of the dashboards already running. It does not add another one.

05 — DIAGNOSTICS

The line is down. Three machines could be the cause.

Opening the wrong one costs the shift. ExlAthena follows the links between assets the way the plant is built, and ranks the likely cause with the evidence for each.

The readings

Which sensors moved, for how long, and how far they sit from the asset's normal behaviour.

The history

Similar failures on this asset class, and what the strip-down found last time.

The layout

What the asset drives and what drives it, so a cause upstream is not chased downstream.

The ranking

Gearbox first. Motor and pump below it, each with its own evidence, so the call can be challenged.

> **WHY THE WORKING IS SHOWN**
>
> An engineer will trust a diagnosis he can argue with. He will ignore one that only gives him a score.



THE CALL, WITH THE EVIDENCE

Ranked causes in his hand before the covers come off.

06 — FROM FINDING TO WORK ORDER

A recommendation is worth nothing until someone owns it.

Every action passes through approval before it reaches the maintenance system. The path has eleven states, and a blocked order stays visible instead of quietly disappearing.

01

Detect

The anomaly is raised with the features that drove it. Bad sensor data is flagged, not silently used.

02

Diagnose

Causes are ranked from the readings, the failure history and the asset layout.

03

Predict

Remaining life comes back as a range, so planning can hold the lower bound.

04

Decide

The plan respects crew skills, spare parts on hand, and the cost of lost production.

05

Approve

The planner accepts or rejects it. The decision and the person are both recorded.

06

Act

The work order moves into the CMMS: scheduled, in progress, closed.

IF THE PLAN CANNOT BE MET

The solver says which constraint broke — no crew with the right skill, no spare in stock — instead of returning no answer at all.

IF THE CMMS REJECTS THE SYNC

The order moves to a retry state and stays on the list. It is never marked as sent when it was not.

The six stages above are modules of the ExlAthena Physical AI engine: signal processing, anomaly detection, root-cause analysis, remaining-useful-life estimation, maintenance optimisation, and the CMMS workflow.

07 — TESTED ACROSS FIVE INDUSTRIES

Measured on public data, including the result that went badly.

These figures come from a benchmark run on 19 September 2026 against published datasets. They are not results from a customer plant, and they are not presented as if they were.

91 of 100
Failing bioreactor batches flagged, on pharmaceutical fermentation data.

80 of 100
Real failures flagged, on 10,000 machining observations from milling.

77 of 100
Real failures flagged, on crusher and boiler sensors from a sugar mill.

12 cycles
Remaining-life error on NASA turbofan engines. The safety case lives or dies on this number.

WHERE IT IS STRONG

Assets with a failure history and steady signals: bioreactors, mills, crushers, boilers. This is where a first engagement should start.

WHERE IT IS WEAK

A metro air-compressor fleet: 58 of 100 caught, with many false alarms. Failures there are rare. An asset class like this one is flagged before a pilot begins, not after.

Datasets: bioreactor fermentation, AI4I 2020, sugar-mill crusher and boiler sensors, NASA C-MAPSS FD001, MetroPT-3. The best model differs by industry — LightGBM, Random Forest, LSTM, XGBoost — and the engine selects it per asset class rather than forcing one model on everything.

08 — WHERE IT FITS

Built around the assets that stop the plant.

The engine ships with industry adapters, each tuned to the sensors and the failure modes of that process. Three of them cover most of the plants in conversation today.

Pharmaceutical manufacturing

Bioreactor temperature, pH, dissolved oxygen, agitator speed. Built for a process where missing an excursion is not acceptable.

Sugar and process mills

Crusher vibration, hydraulic pressure, boiler steam conditions. Aimed at the season where one unplanned stop costs the shift.

Rotating equipment, any industry

Motors, gearboxes, pumps, compressors. Vibration, temperature and current — the signals most plants already capture.

> **WHAT WE NEED FROM YOU**
>
> Sensor history for one asset class, the work-order log, and a maintenance lead who can say whether an alert was real. No new instrumentation.



ONE ASSET CLASS FIRST

The whole plant comes later. The asset that hurts comes first.

09 — FOUR WEEKS, ONE ASSET CLASS

The decision rests on the plant's own history.

No new sensors, no plant-wide programme, no twelve-month implementation. The work starts on the machine that costs the most when it stops.

WEEK 1

Connect

The sensors, the failure log and the CMMS are mapped. The plant names the asset that fails most.

WEEK 2

Prove it

The history is replayed: which past failures would have been caught, and which would have been missed.

WEEKS 3 – 4

Decide

Live alerts with the reasoning, one recommendation, and one work order taken through approval.

WHAT THE PLANT PROVIDES

Sensor history for one asset class, the work-order log, and one maintenance lead for a few hours a week.

WHAT COMES BACK

A catch rate measured on the plant's own data, the assets ranked by risk, and one alert carried all the way to an approved work order.

THE NUMBER THAT MATTERS

The benchmark in this brochure shows the method works on data of this kind. The figure that decides the project is the one produced on the plant's own historian, in week two, while stepping back is still easy.

ExlAthena reads the historian, ERP and CMMS already in operation. It sits alongside them. It does not replace them, and it needs no new instrumentation.



Exl Athena

10 — TALK TO US

Start with the asset that stops the plant. Everything else follows.

A first conversation takes half an hour. It starts from the last failure that hurt, and ends with an honest view of whether the data on hand is enough to see the next one.

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