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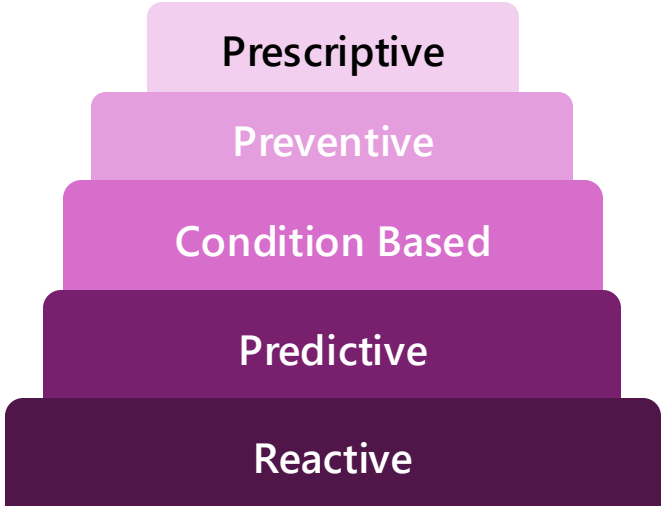
Maximizing Uptime: Veraqor's Predictive Maintenance Solution

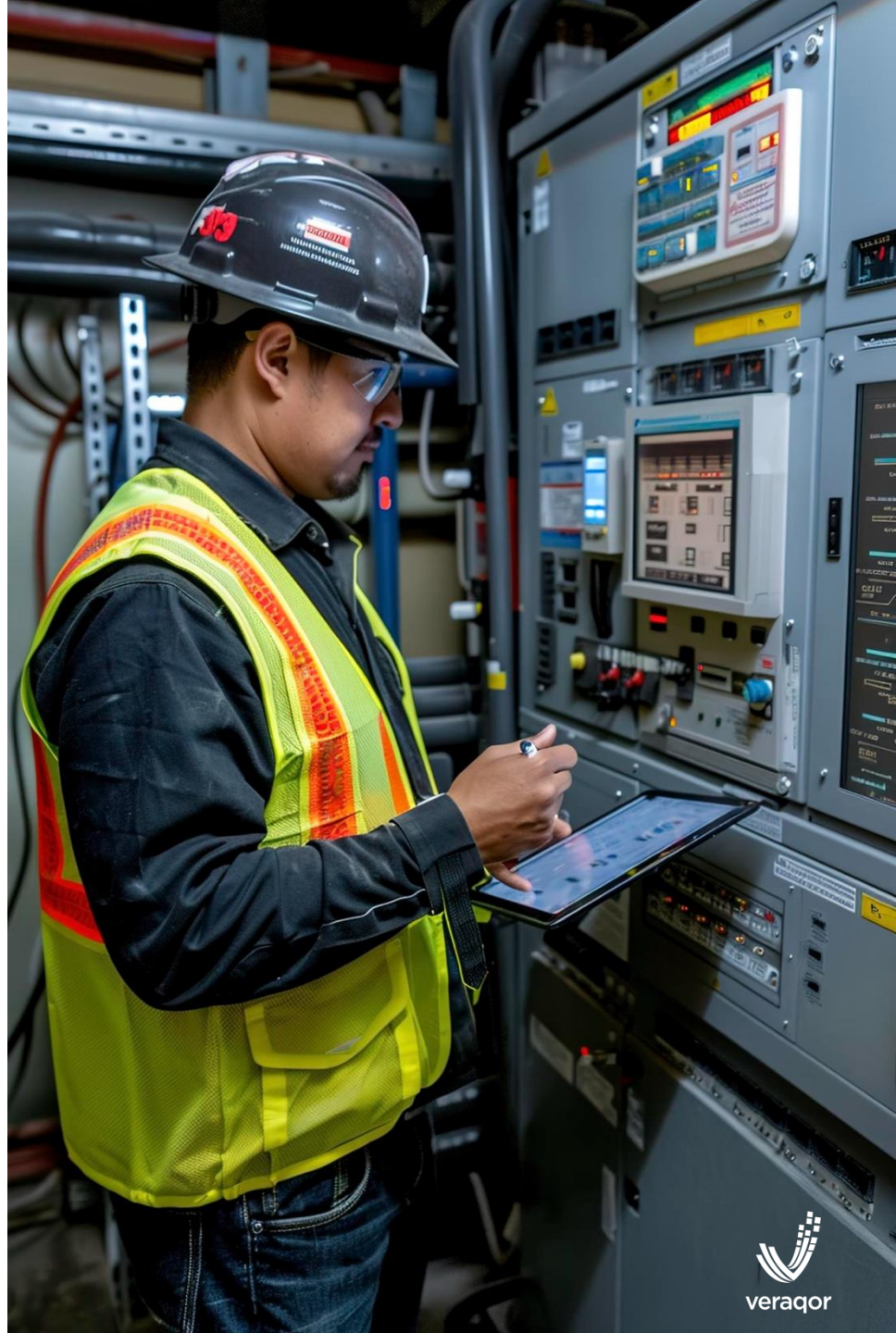
Microsoft

The Stakes

- $50B annual cost of unplanned downtime - (Source: Deloitte)
- Reactive maintenance = costly surprises
- Preventive maintenance = inefficiencies

Levels of Maintenance:





Predictive Maintenance

AI-empowered predictive maintenance boosts equipment reliability and helps organizations stay ahead of unexpected issues that can easily disrupt production.

By analyzing metrics and data related to the lifecycle maintenance of IoT-enabled equipment through predictive maintenance, companies can predict both timelines for probable maintenance events and upcoming capital expenditure requirements, allowing them to streamline their maintenance costs and avoid critical downtime.

Key Benefits

Improved equipment reliability

Reduced downtime and inspection costs

Enhanced safety standards

Optimized scheduling

Prevents unexpected breakdowns

Increased energy efficiency

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The Value Proposition

Integrating your entire production ecosystem isn't just an option; it's a competitive imperative.

- Reduce downtime by up to 30%
- Extend asset life by 20–40%
- Cut maintenance costs by 20–25%
- Optimize labor and spare parts

Real-World Impact Story

United Tractors, operating across 100+ sites, struggled with high downtime and manual maintenance. By moving SAP HANA to Microsoft Azure, they embraced AI-driven predictive maintenance and real-time analytics. This cloud-first strategy cut unplanned downtime by 30%, boosted uptime by 25%, and enabled 30x faster application deployment—no extra capital needed.

What You Gain with Integrated Process Management?

- **Seamless Collaboration** - Eliminate departmental silos and enable real-time coordination between production, maintenance, and quality teams.
- **Actionable Insights** - Access a unified dashboard that provides instant visibility into key production metrics, helping you pinpoint bottlenecks and drive improvements.
- **Agile Operations** - Quickly adapt to fluctuations in demand or unexpected supply disruptions with a system that updates data in real time.
- **Data-Driven Decisions** - Consolidate diverse data sources into one coherent platform, empowering you to make smarter, strategic decisions that propel growth.

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The Challenge

Internal resistance

Lack of envisioning the long-term benefits

Expecting tech partner to over-deliver on industrial knowledge

Upfront cost of implementation and deployment of solution

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The Challenge

"We already have predictive maintenance offered from vendor we buy the machines from..."

- *"Is your current system siloed to individual machines or plants?"*
- *"Can you aggregate predictive insights across assets, sites, and business units?"*
- *"Do you have automated escalation, alerts, or integrations with planning or supply chain systems?"*
- *"Is the model improving over time as it learns from new failure patterns?"*
- *"Can you simulate different maintenance strategies or asset failure scenarios?"*

Most off-the-shelf PdM tools are black boxes, limited in scope, and lack integration or long-term learning capabilities.

Coexistence, Not Replacement

"We're not here to rip and replace — we're here to complement, enhance, and integrate what you already have into a future-ready platform."

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Predictive Maintenance Trends

01

74% of oil and gas companies use some form of predictive maintenance to **reduce unplanned downtime.**

02

The **global predictive maintenance** market in the oil and gas industry is expected to grow at a CAGR of 25.7% from 2021 to 2028.

03

Predictive maintenance can reduce **unplanned downtime** by up to 50%, ensuring better outcomes for enterprises.

04

Companies that use predictive maintenance experience a 27% increase in **equipment availability** and a 30% reduction in maintenance costs.

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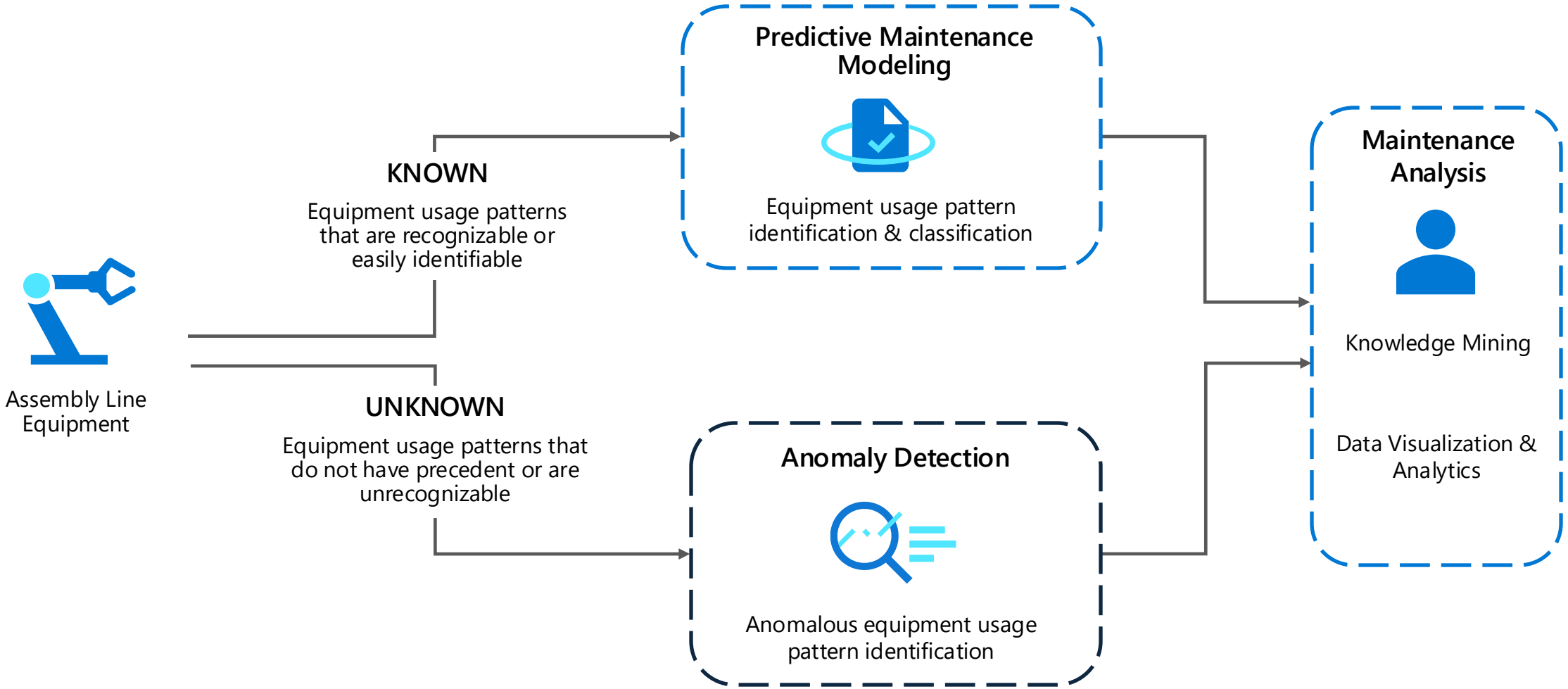
Predictive Maintenance Solution Overview

Proactively maintain machinery to avoid downtime & excessive costs



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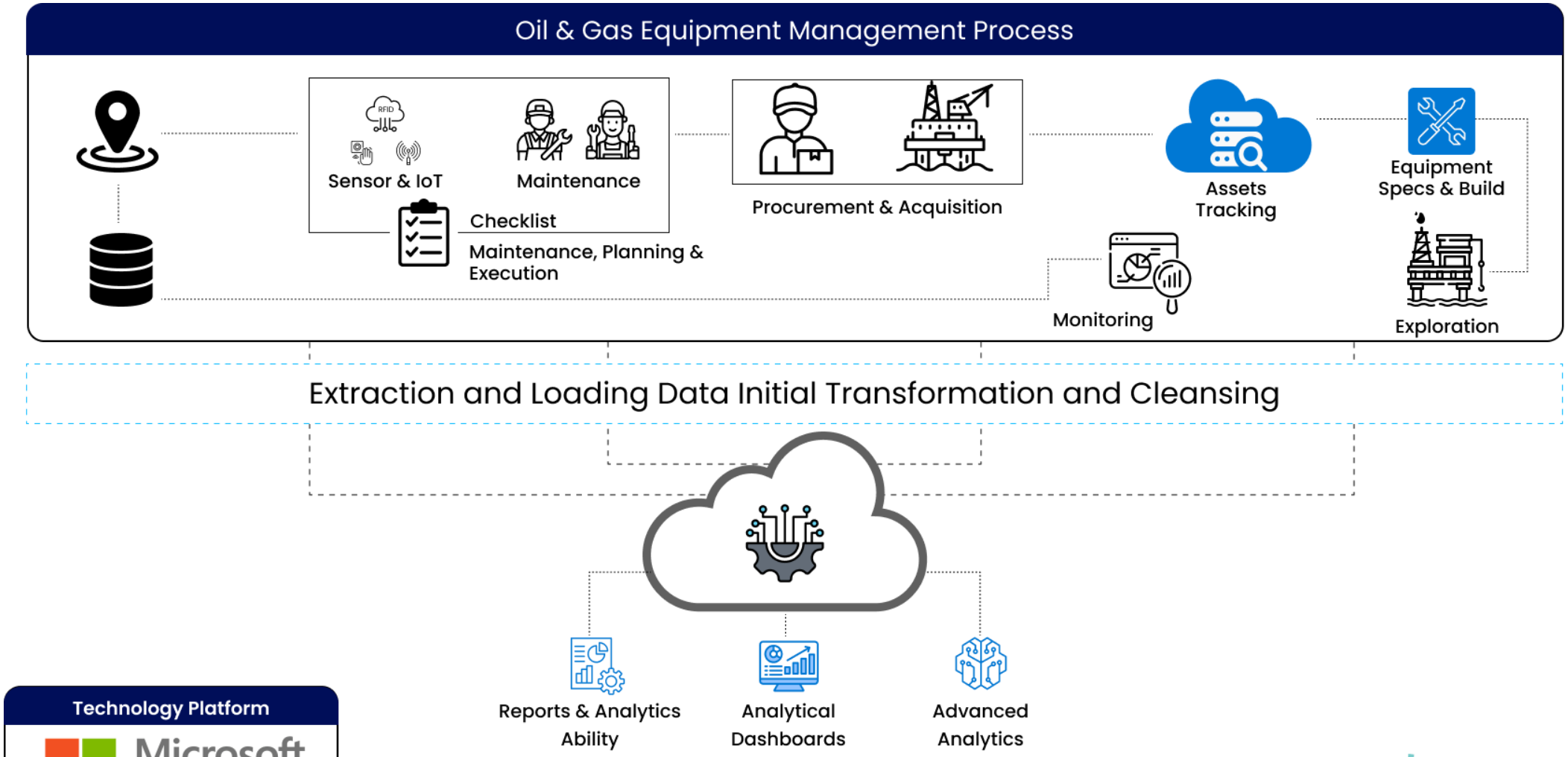
Customer Use Case: Oil & Gas Equipment Management



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Work Done

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Work Done

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Case Study – Newcrest Mining (Australia)

Challenge:

Newcrest Mining experienced over 4,700 minutes of downtime in just six months due to recurring sensor failures in ore chutes. The unreliable sensor data limited visibility into ore flow, disrupted production, and posed safety risks in remote, underground environments. Manual inspections were frequent and hazardous, impacting both efficiency and worker safety.

Solution:

Partnered with Microsoft and Insight to implement an Azure-based IoT solution with edge AI capabilities. The system collects real-time data from ruggedized sensors deployed in ore chutes and processes it locally using edge computing. This enables instant failure detection, predictive maintenance insights, and ore flow monitoring — even in bandwidth-constrained environments. The solution is scalable, secure, and integrates with existing operational systems.

Outcome:

- Significantly reduced downtime from sensor failures
- Increased mill throughput with improved ore flow insights
- Enhanced safety by reducing the need for manual inspections
- Scalable deployment across multiple sites with measurable ROI and operational efficiency gains

Case Study – Furnas (Brazil)

Challenge:

Furnas, a major Brazilian electric utility, faced challenges in efficiently managing and maintaining its extensive infrastructure, which includes over 21,000 kilometres of transmission lines and 15 hydroelectric plants. The company sought to enhance operational efficiency, reduce maintenance costs, and improve the reliability of its energy generation and transmission systems.

Solution:

Furnas implemented a predictive maintenance solution leveraging Microsoft Azure's cloud computing capabilities. The solution involved:

- **Data Integration**: Collecting and consolidating data from various equipment and sensors across their facilities.
- **Advanced Analytics**: Utilizing Azure's machine learning and AI tools to analyze data and predict potential equipment failures before they occur.
- **Real-time Monitoring**: Implementing dashboards and alerts for continuous monitoring of equipment health and performance.

Outcome:

By adopting this predictive maintenance approach, Furnas achieved:

- **Reduced Downtime**: Early detection of equipment issues allowed for timely interventions, minimizing unplanned outages.
- **Cost Savings**: Optimized maintenance schedules and resource allocation led to significant reductions in operational expenses.
- **Enhanced Reliability**: Improved system reliability and performance, ensuring consistent energy delivery to customers.

Case Study – Fincantieri (Italy)

Challenge:

Fincantieri, a global leader in shipbuilding and mechanical components, relied on reactive maintenance for its steam turbogenerators. This approach led to unexpected equipment failures, increased downtime, and high costs associated with emergency repairs and supplemental energy purchases.

Solution:

In 2020, Fincantieri partnered with beanTech to implement a predictive maintenance system using Microsoft Azure Data Explorer (ADX). The solution involved:Microsoft Learn+2Microsoft Learn+2Microsoft+2

- **Data Integration:** Collecting real-time data from sensors across 170 turbogenerators.Microsoft
- **Advanced Analytics:** Utilizing ADX's capabilities to analyze performance metrics and predict potential failures.Microsoft
- **Remote Monitoring:** Enabling continuous, remote oversight of equipment health, reducing the need for on-site inspections.

Outcome:

By adopting this predictive maintenance approach, Fincantieri achieved:

- **25% Reduction in Maintenance Interventions:** Proactive monitoring allowed for postponing unnecessary maintenance activities.
- **Enhanced Equipment Reliability:** Early detection of issues led to timely interventions, minimizing unplanned downtime.
- **Optimized Spare Parts Management:** Better planning and utilization of spare parts inventory, leading to cost savings.

Predictive Maintenance Scoping Plan

Understand Failure Modes

Identify common failure modes and impact on key metrics:

- Failure Modes
- Frequency of failure
- Location of failures
- Key business metrics

Review Existing Models

Evaluate existing predictive maintenance models and applicability to field equipment

- Variables
- Failure modes identified
- Model performance

Map to Sensors

Identify potential sensor types for identifying pre-failure conditions on target devices. (ex. Temperature, vibration, RPM)

Recommendations

Create recommendations for next steps based on discovery period

- Data collection
- Instrumentation approach

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Roadmap

Phase 1:
Predictive maintenance using historical data

Phase 2:
Incorporating IoT sensors

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Proposed Phase 1

Predictive Maintenance Solution for your industry

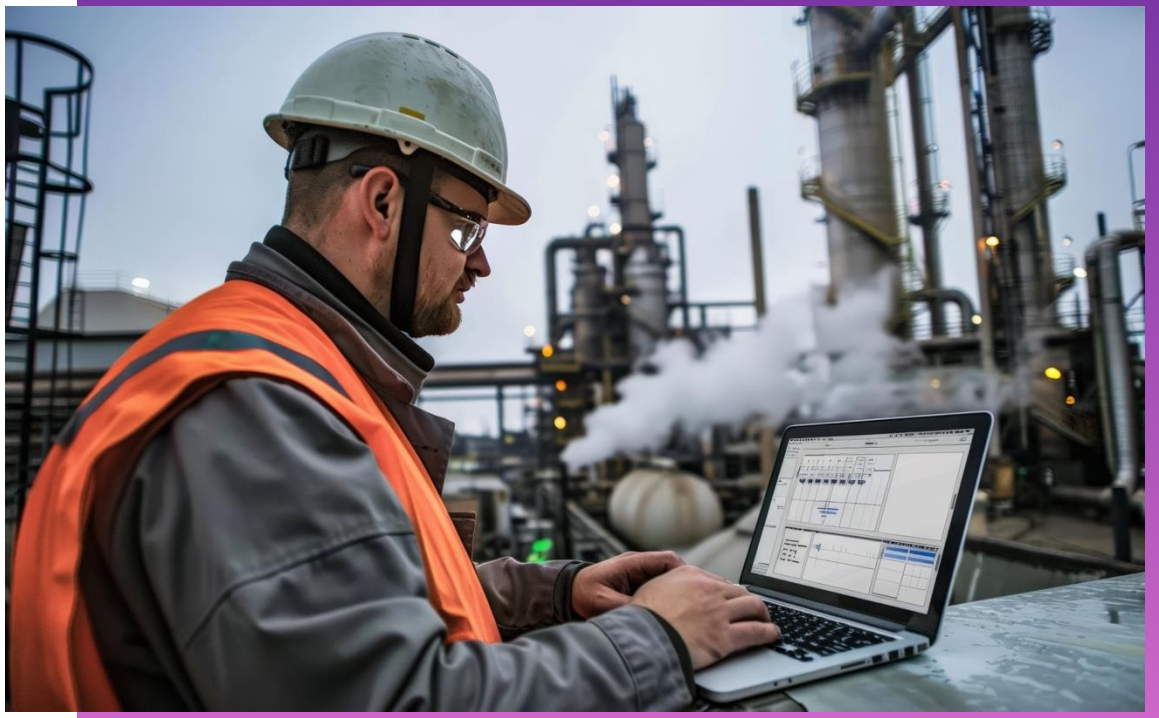
Leveraging the power of data and AI, this solution is designed to ensure operational excellence, minimize downtime, and optimize costs.

Predictive Maintenance Using Historical Data

Our predictive maintenance solution harnesses your rich historical data to develop cutting-edge AI/ML models. These models analyse equipment performance trends and identify patterns that predict potential failures

By understanding these patterns, you can:

- **Proactively Address Equipment Failures** - Anticipate issues before they lead to costly breakdowns.
- **Optimize Maintenance Schedules** - Shift from reactive to predictive maintenance, reducing unnecessary interventions.
- **Extend Equipment Lifespan** - Reduce wear and tear by addressing problems at their root cause.



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Proposed Phase 2

Integrating Real-Time Analytics with IoT Sensors

To further elevate the solution, we propose integrating real-time analytics using IoT sensors. Collaborating with trusted third-party providers like **Siemens** or **Honeywell**, we can deploy the most suitable sensors to monitor critical equipment parameters in real time.
Key aspects of this enhancement include:

- **Continuous Monitoring** - IoT sensors provide a constant stream of data on temperature, pressure, vibration, and other key metrics.
- **Real-Time Alerts** - Instantaneous insights empower yourself to act swiftly on emerging issues.
- **Data-Driven Collaboration** - Seamlessly integrate sensor data with AI/ML models, refining predictions and enabling more accurate failure detection.

Benefits of this Solution

1. **Increased Uptime** - Reduce unplanned outages through proactive interventions.
2. **Cost Efficiency** - Save a significant amount annually by avoiding catastrophic equipment failures and optimizing maintenance resources.
3. **Enhanced Safety** - Minimize risks to personnel and the environment by ensuring equipment integrity.

Honeywell SIEMENS

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Proposed PoC Timeline for Phase 1

A Quick Roadmap

Data Preparation / Assessment

Data ingestion, cleaning, feature engineering, and profiling.

Duration: 2 – 3 Weeks

Model Development

Model training, testing, and evaluation using historical data.

Duration: 3 – 4 Weeks

Visualization

Create Power BI dashboards and integrate predictions with actionable insights.

Duration: 1 - 2 Weeks

Validation

PoC demonstration, validation with real-world scenarios, and final refinements.

Duration: 1 Week

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Optimized Outcomes & Strategic Next Steps

Expected Outcomes

- **Actionable and Timely Failure Predictions**
  - Accurately identify equipment at risk of failure.
  - Deliver proactive maintenance recommendations to mitigate risks.
- **Cost and Efficiency Insights**
  - Detect inefficiencies in existing maintenance workflows.
  - Uncover opportunities to minimize costs and reduce downtime.
- **Scalable Architecture**
  - Build a future-proof platform for seamless IoT sensor integration and real-time data processing.

Future Considerations for Performance Improvement

- **Sensor Integration**
  - Leverage IoT sensors and Fabric connectors for continuous real-time data ingestion.
  - Enhance model accuracy with real-time operational insights.
- **Advanced ML Models**
  - Expand capabilities with deep learning models as data diversity increases.
- **Data Governance and Compliance:**
  - Ensure security and regulatory compliance using Fabric's built-in governance tools.

Next Steps to Begin Working

1. Conduct a data assessment workshop to evaluate historical data quality and completeness.
2. Develop a Proof of Concept (PoC) to validate predictive maintenance capabilities.
3. Present PoC outcomes to stakeholders and refine the solution based on their feedback.

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Thank you.

Why Veraqor?

Veraqor Core Capabilities:

- Real-time Manufacturing Analytics
- Lifecycle Data Analysis
- Integrated Process Management

Microsoft Solutions Partner for:

- Data & AI
- Digital Apps & Innovation

Over a decade of working experience within the oil and gas industry

Discover our impact >> https://www.veraqor.io

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