
AWS
re:Invent
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AIM211

Improve uptime with predictive maintenance for industrial equipment

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Agenda



Introduction to Industrial AI
Alicia Trent, AWS

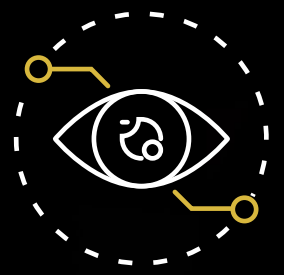
Amazon Monitron evolution
Shalika Pargal, AWS

Business impact of Amazon Monitron and AWS
A.K. Karan, Baxter International, Inc.

Operational challenges solved, learnings, and global deployment
Adam Aldridge, Baxter International, Inc.

Q&A

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Industrial AI activates new capabilities across industries



Activate condition monitoring across all processes and assets



Improve manufacturing product quality



Optimize logistics by tracking throughput, operations, and objects

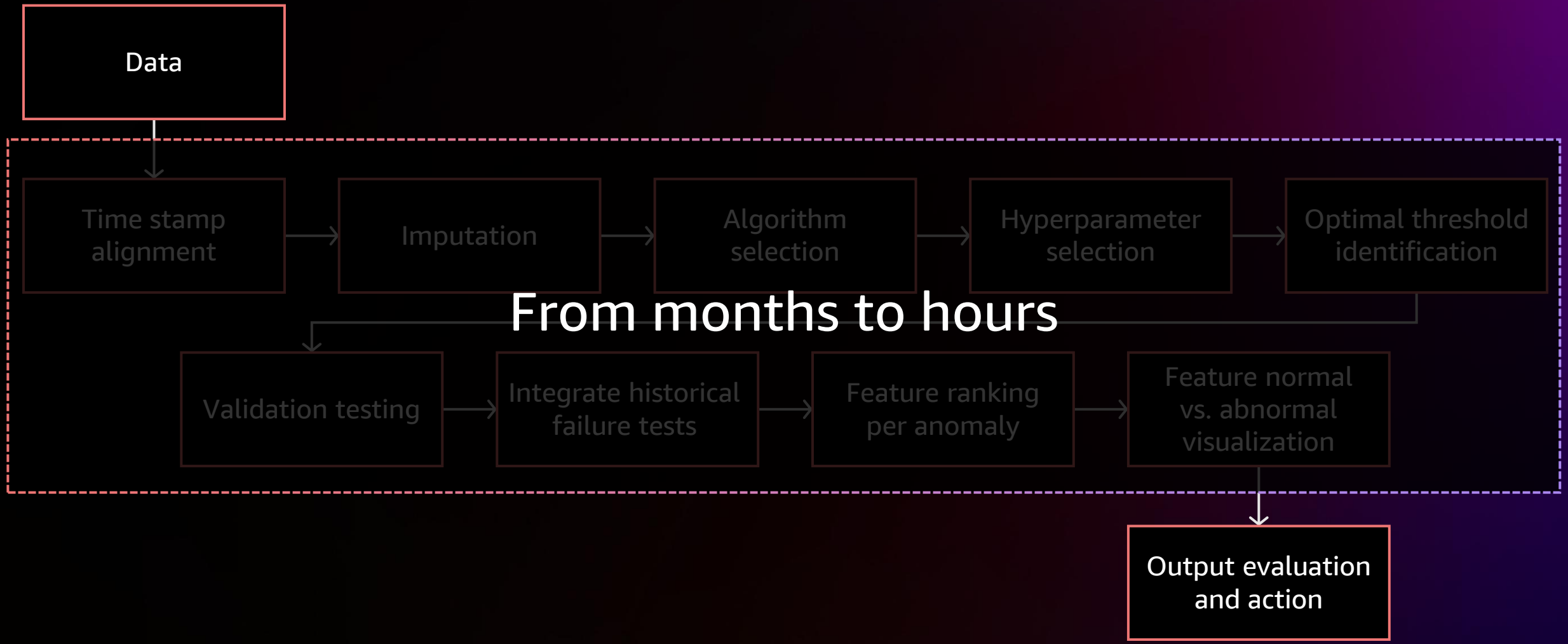


Enhance worker safety on jobsite

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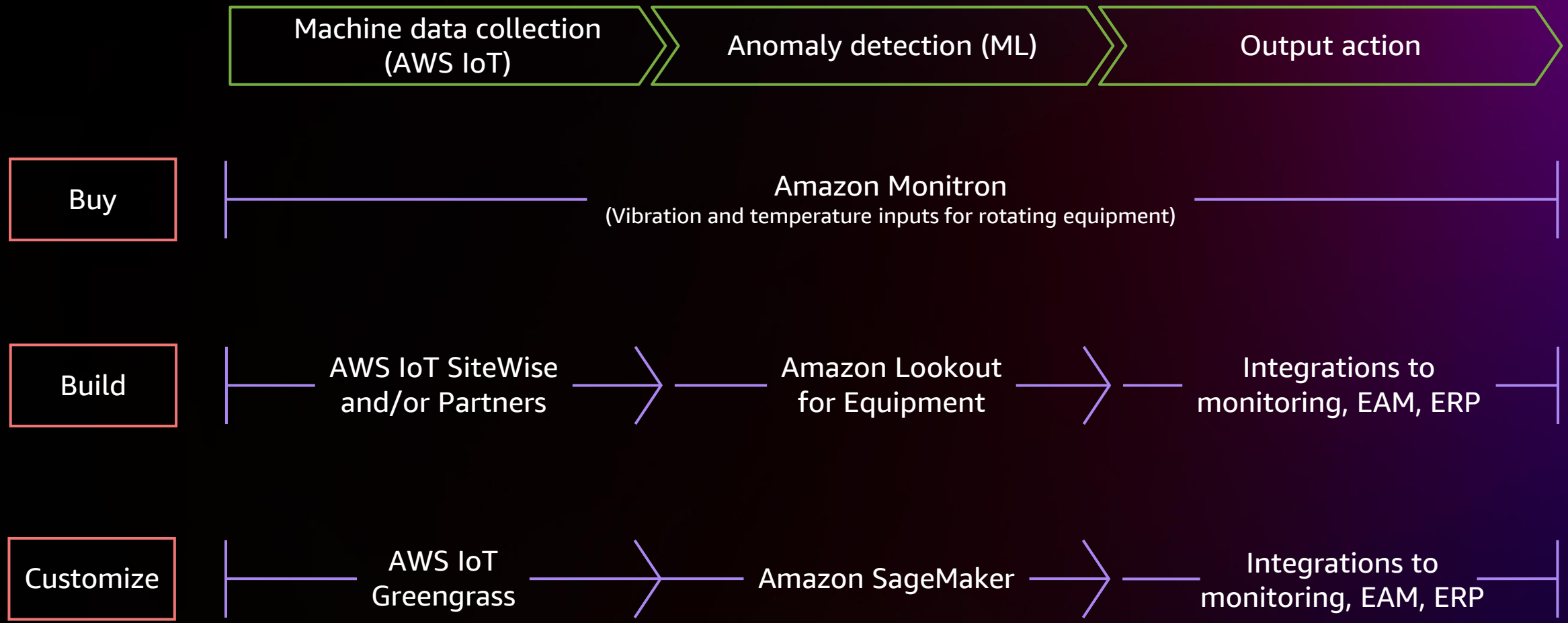
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Accelerate time to value



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How can AWS IoT and AI/ML help with PdM?



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Impact from industrial AI

KOCH AG & ENERGY SOLUTIONS

"Lookout for Equipment **correctly alerted** to a **bearing temperature issue** within a compressor at one of our nitrogen processing facilities, **hours before** any other monitoring method."

Tyson

"With this solution, plants can save 1 hour of team member time per day per line. This would **save this plant alone an estimated 15,000 hours of skilled labor annually**. This would free up the time of valuable Tyson team members to complete other, more complex tasks."

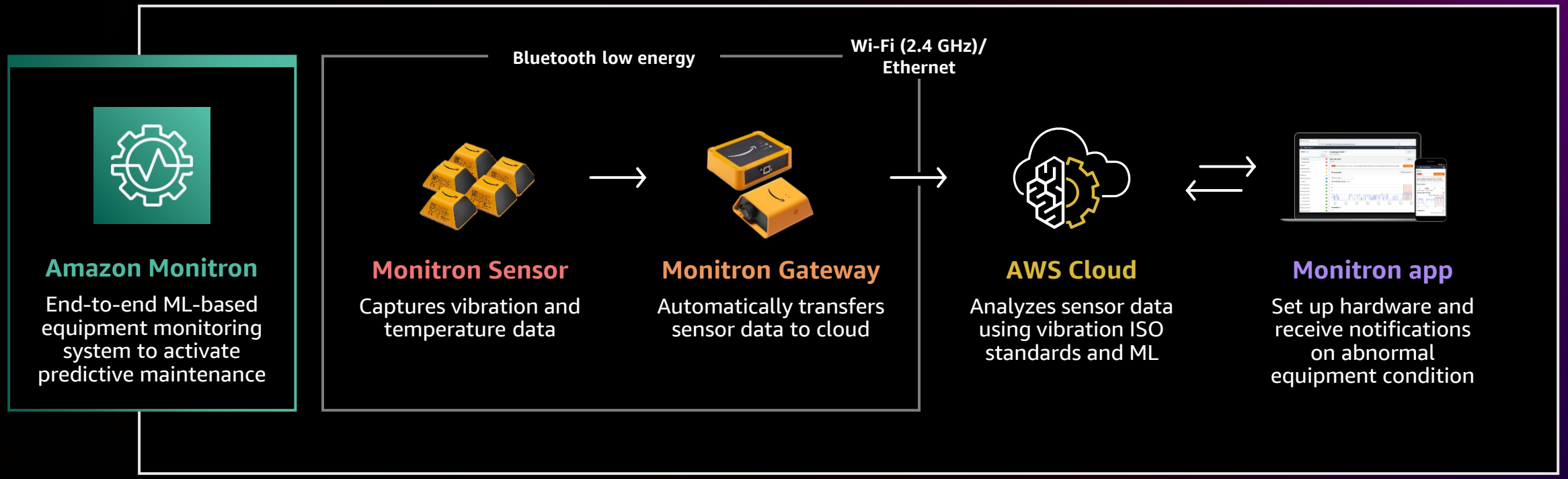
GS EPS

"We have been generating data across our assets for over a decade now but have only been using physics and rules-based methods to gain insights into our data. [We] are enabling our **plant operation teams to build models on our equipment with no ML expertise** required."

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Amazon Monitron: How it works



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What’s new with Amazon Monitron

DEVICES



Monitron Sensors



Monitron Gateway

- Amazon Monitron devices are now certified for **Australia**, **New Zealand**, **Japan**, **Turkey**, and **Singapore**
- Increased Amazon Monitron sensor battery life from **3 to 5 years**
- Support for **Ethernet gateway,** a new gateway device that allows customers to use their ethernet network to connect Amazon Monitron to the internet

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What’s new with Amazon Monitron

ENHANCED NOTIFICATIONS



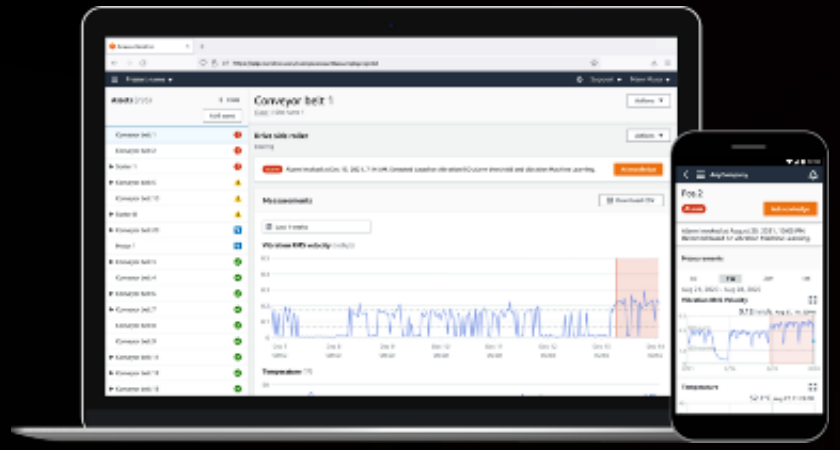
Amazon Monitron app

- Notifications now include
  - **Severity –** based on health of the asset
  - **Type –** vibration or temperature
  - **Source of alert –** ISO model or ML model
- Ability to **mute** ISO-based notifications
- Indication of sensor and gateway going **offline**

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What's new with Amazon Monitron

ACCESSING DATA



Data export

Amazon Monitron can stream live data to a Kinesis data stream thus helping you

- Use the data to automatically submit **work orders** in asset management systems like Infor, IBM Maximo, SAP PM
- Embed Amazon Monitron insights into your **own dashboards**
- Use the **data and inference** results for other analytics you may want to perform

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Baxter Healthcare

WHO ARE WE

- Global leader in the healthcare space with a mission to **save and sustain lives**
- Broad product portfolio; global presence (~70 manufacturing locations)
- **~14.1B** in revenue; **28B** in market cap; **8** GBUs; **50,000** SKUs



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Supply chain resiliency

- A different world post-COVID
- Labor shortage – challenges with skilled labor
- Cost pressures
- Traditional methods do not work

NEED FOR RELIABLE AND SUSTAINABLE OPERATIONS



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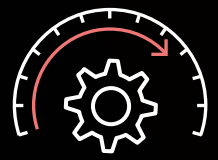
Need for a reliable solution

- Need to monitor our facilities and critical infrastructure equipment 24 x 7 x 365
- Avoid element of surprise – major impact on OEE and ability to serve our customers/patients
- Migrate from condition-based maintenance (CbM) to predictive maintenance (PdM)/preemptive maintenance









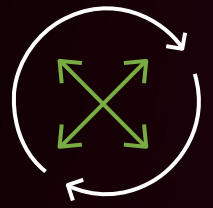
Speed



Cost



Value



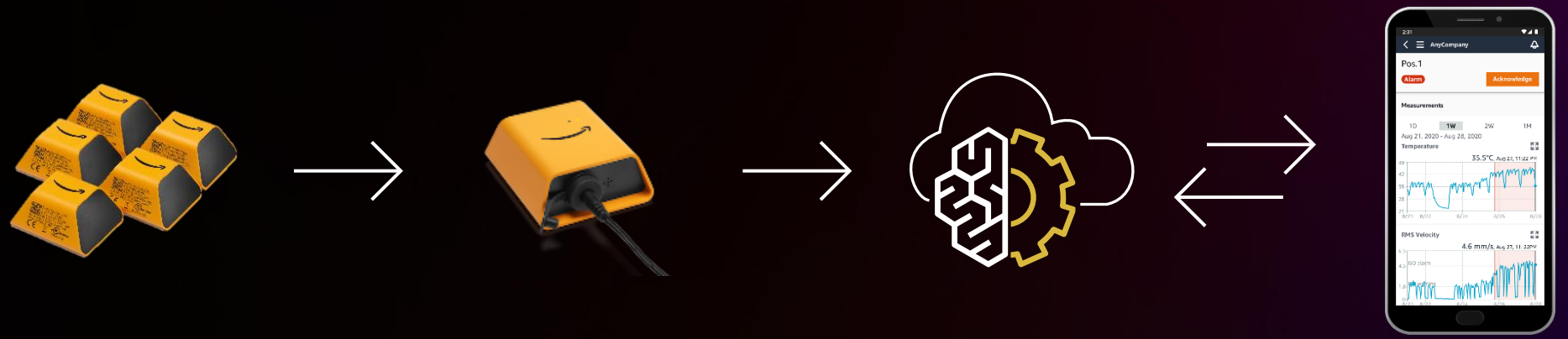
Scale

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Amazon Monitron

- End-to-end solution
- Easy to deploy
- Cost-effective
- Embedded machine learning – no need for specialists
- Rapid value generation



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Operational challenges

- **Real-time data collection** – eliminates need for manual collection of vibration data
- **Rapid decision-making** – readily available data to make decisions
- **Increased productivity** – allows our technicians to monitor larger amount of assets than ever before
- **Disruptive and complementary** – pairs with other predictive technologies to diagnose and confirm alarms



Figure 1



Figure 2

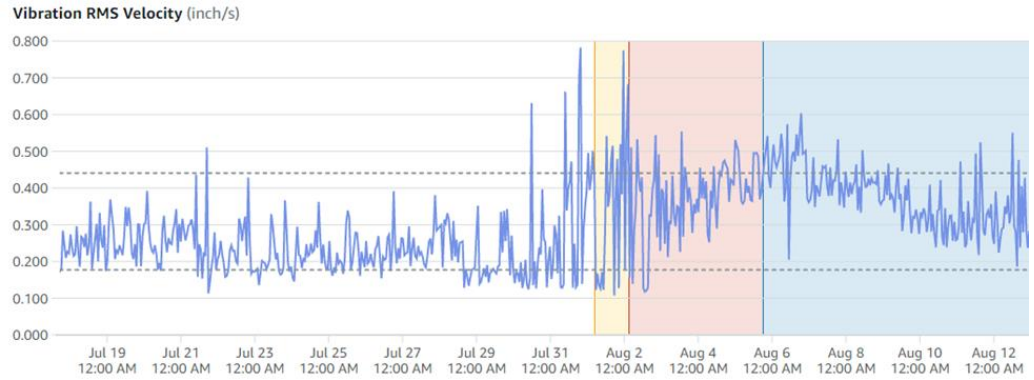
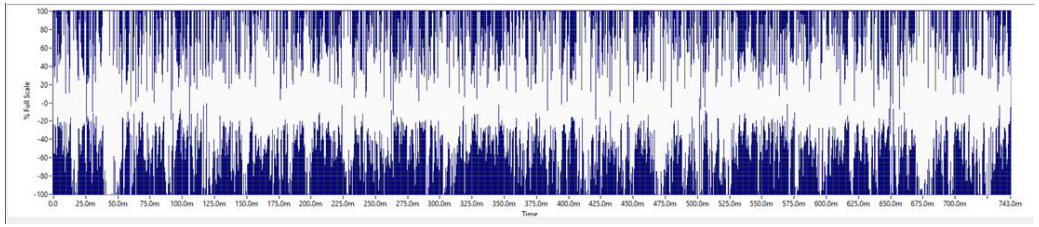


Figure 3



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Our first win

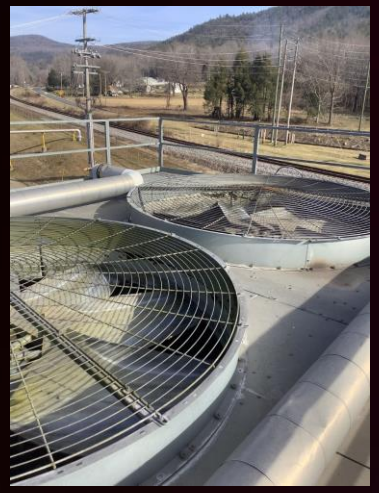
Cooling tower provides chilled water for 2 production areas (33 machines) to maintain room temperature

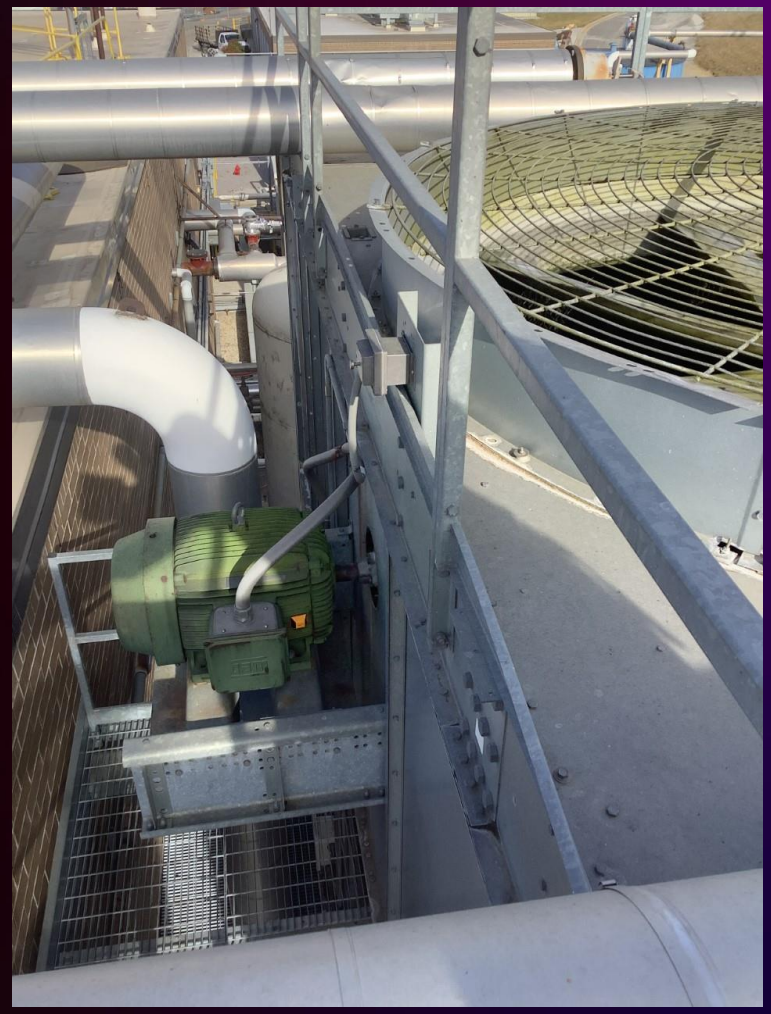
- Amazon Monitron provided a high ISO vibration alarm
- Technician responded to the alarm and **identified** gearbox in a near critical failure state
- Maintenance crew was scheduled to replace the gear box with minimal interference to operations

Value creation

- ~396 machines hours of downtime avoidance







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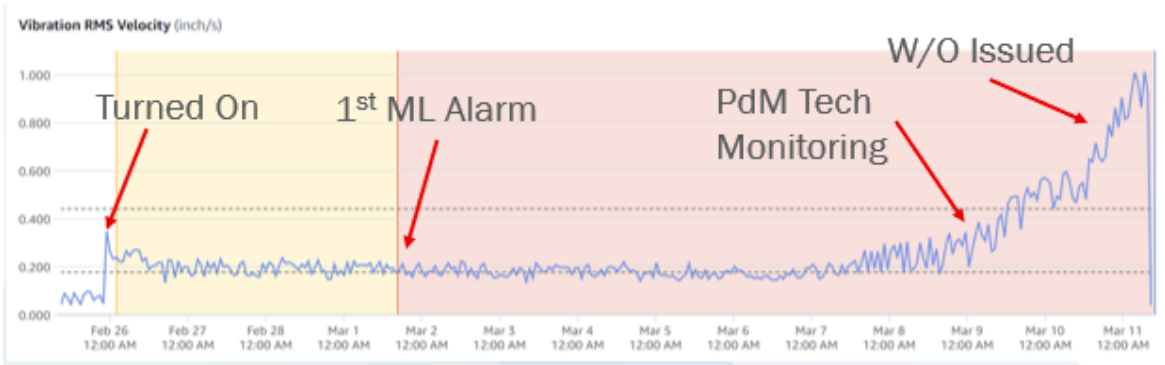
What was learned

- Normal operating baselines in a matter of weeks instead of years
- Improve asset maintenance plan
- ISO vs. machine learning alarms
- How to build our predictive maintenance deployment around Amazon Monitron capabilities

Figure 1



Figure 2



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Our journey with Amazon Monitron continues

- Started with a proof-of-concept (PoC) with **~400 sensors** at 1 site; **deployed in 1 month**
- PoC was successful with a tangible outcome
- Scaled to entire site (~2,600 sensors) **deployed in a few months with team of 5 people**
- Scaling to other global manufacturing sites in our network
- Target to finish **global deployment** across **70 plants**

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Thank you!

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