



Amazon Monitron

Bring intelligent insights to your industrial operations with Amazon Monitron

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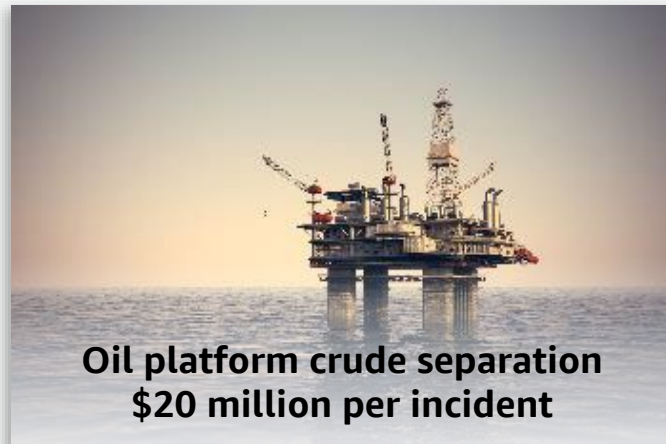
Typical cost of unplanned downtime



The cost of unplanned downtime is significant for all industry sectors:

- Lost revenue
- Work-in-progress losses
- Safety concerns
- Environmental concerns

<https://www.arcweb.com/industry-best-practices/trends-technologies-plm>



Industrial maintenance strategy

Customers are moving away from reactive and planned maintenance approaches to data-driven operations of proactive and predictive maintenance

Three stages of predictive maintenance:

1. Anomaly detection

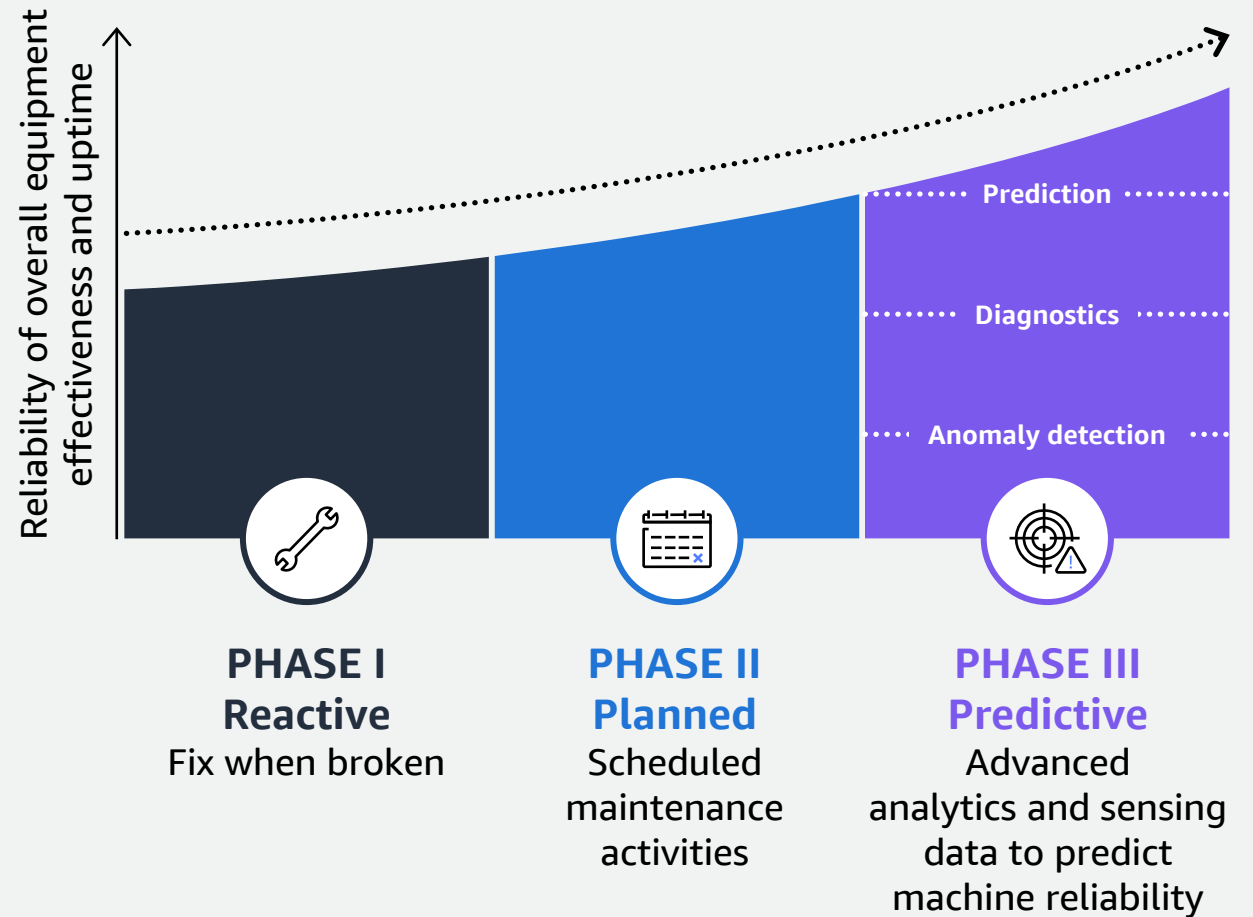
Detect anomalous trends

2. Diagnostics

Identify root cause

3. Prediction

Estimate remaining useful life



Predictive maintenance solutions can be difficult and costly to implement



Require installing expensive sensors

Building sensors can be an expensive and iterative process



Building infrastructure to capture and securely transfer the data

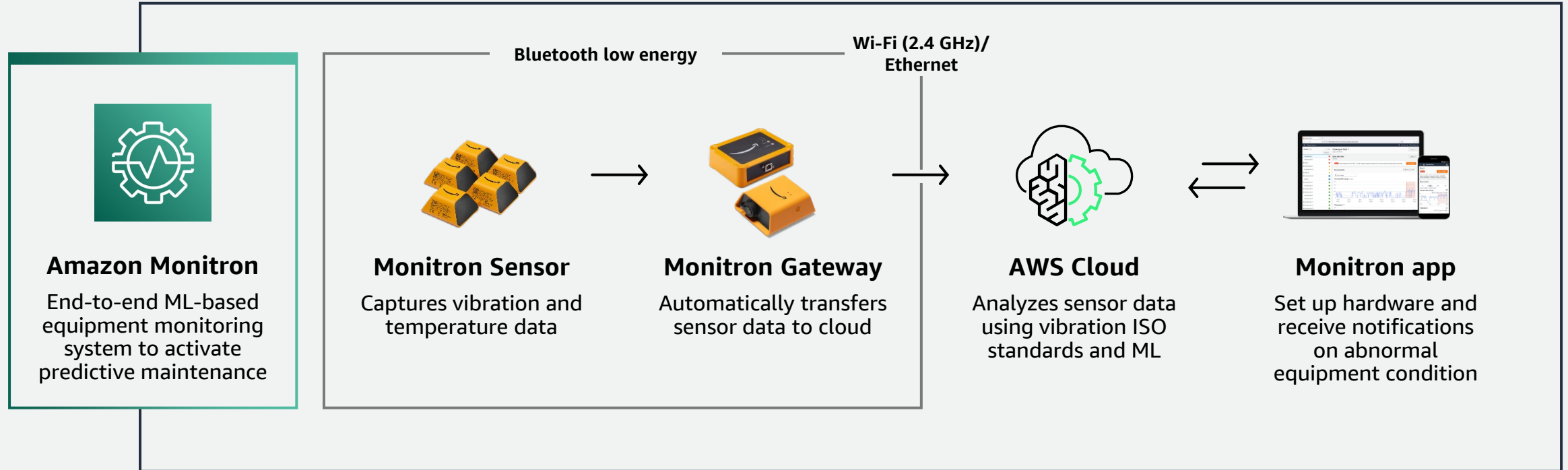
Setting up a more secure connectivity and data pipeline to the cloud can be a complex and undifferentiated task



Analyzing sensor data for potential failures

Developing an analytics backend requires sophisticated software development capabilities and data science skills

Amazon Monitron: How it works



Amazon Monitron

KEY FEATURES



ISO and ML-based analytics

Automatically detect anomalies with International Organization for Standardization (ISO) rules and ML enabled models.



Timely notifications in the Amazon Monitron app

Amazon Monitron sends push notifications to users in the Amazon Monitron mobile or web app when abnormal machine patterns from the vibration and temperature sensors are detected. With a few steps in the app, technicians can enter feedback on the alerts received. Amazon Monitron learns from that feedback and continually improves over time.



Fully managed, low-cost wireless sensors and Wi-Fi gateways

Included low-cost wireless sensors that can be attached to your equipment and Wi-Fi gateways that are used to transfer sensor data to AWS. Amazon Monitron sensors and gateways are preconfigured to work with the service, which helps reliability managers quickly install and start using these devices to monitor their equipment without any development work.

Amazon Monitron

TOP USE CASES

Applications include rotating industrial equipment that is used in many industries, including but not limited to:

- Bottling
- Paper and pulp
- Textile
- Heavy machinery
- Automotive
- Consumer packaged goods

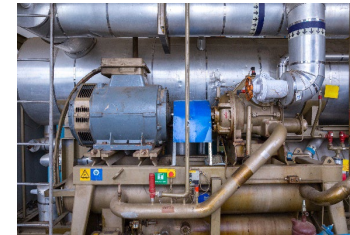
Machine examples



Pumps



Fans



Compressors



Motors



Gearboxes



Bearings

Amazon Monitron

BENEFITS



Simplified

Set up doesn't require development work or knowledge of ML



No ML experience required

Detect abnormal machine condition in advance and reduce unplanned downtime



Cost effective

Low upfront investment and pay-as-you-go software



Data security

More secure end-to-end including hardware and software



Continual improvement

Continually improve hardware with over-the-air (OTA) updates and ML based on user feedback

What's new with Amazon Monitron

DEVICES



Monitron Sensors

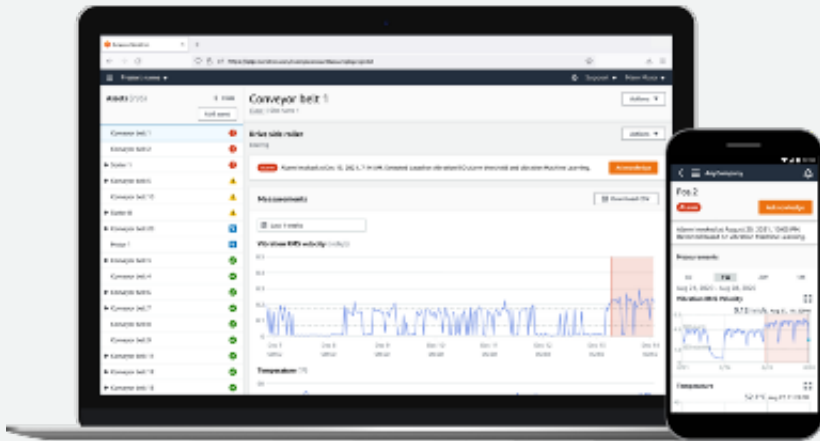


Monitron Gateway

- 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

What's new with Amazon Monitron

EASE OF USE

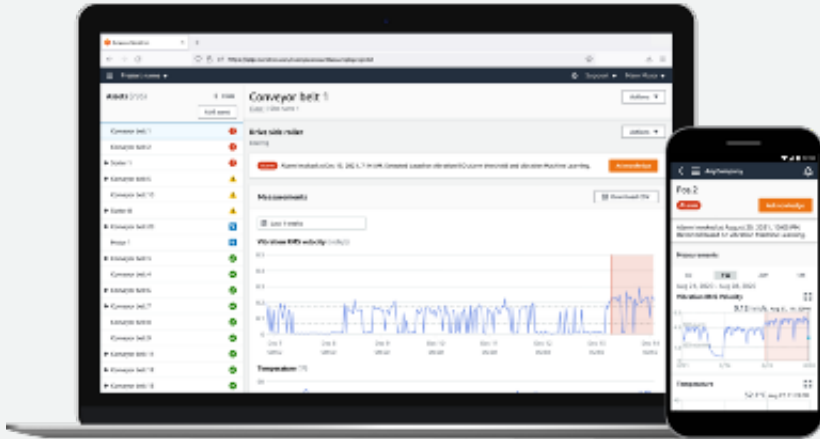


Amazon Monitron app

- **Enhanced user workflow** for vibration and temperature charts
- **Easily identify sensors** using NFC tap
- **Improved App login** experience
- Ability to **update and change equipment class** on position of asset
- Mobile and Web app now available in **Spanish, Portuguese and French**

What's new with Amazon Monitron

ACCESSING DATA



Data export

Amazon Monitron can stream live measurement data and inference results 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 or build your dashboard** using our step by step guidance provided in the [Monitron blog](#).
- Use the **data and inference** results for other analytics you may want to perform



Monitron use case - Baxter

BUSINESS NEED

Baxter's network of 70 manufacturing sites worldwide operates 24/7 in a highly complex, dynamic, and regulated environment. Baxter needed an equipment-monitoring solution that could build resiliency in its operations and reduce unplanned equipment downtime so that the company could deliver life-saving products to customers and patients on time.

SOLUTION

Baxter uses Amazon Monitron to detect abnormal conditions in manufacturing equipment. Technicians can review issues immediately and schedule maintenance rather than responding to emergency repairs.

SCALE

- Started with a proof-of-concept (PoC) with ~400 sensors at 1 site.
- Scaled to entire site (~2,600 sensors) deployed in a few months with team of 5 people
- Target to finish global deployment across 70 plants

IMPACT

- Prevented 500 machine hours of unplanned downtime in one facility
- Reduced manual inspection time for technicians
- Improved operational efficiency and quality by automating inspection tasks

The Baxter logo is displayed in a bold, blue, italicized sans-serif font.

“Amazon Monitron has given us the actionable data needed to maintain the thousands of manufacturing assets in our facilities, allowing us to predict and preempt unplanned equipment downtime.”

—**A. K. Karan, Global Senior Director of Digital Transformation, Baxter International Inc.**

https://www.youtube.com/watch?v=xR_Mcecn5kk0



Monitron use case-Amazon fulfillment center

BUSINESS NEED

Amazon expects its fulfillment centers to meet customer promises for timely order delivery. Packages at fulfillment centers daily traverse miles of conveyor and sorter systems, so it's crucial for the miles of conveyor and sorting systems to operate reliably.

SOLUTION

Amazon Customer Fulfillment reduced unplanned equipment downtime hours significantly using Amazon Monitron and can better fulfill customer orders on time.

SCALE

- 33 fulfillment centers
- 25,000 sensors
- 700 gateways
- 9,000 assets

IMPACT

- 69% reduction in unplanned equipment downtime hours
- Increased staff productivity
- \$22.75 million saved by avoiding unplanned downtime, lost production hours, and late shipment costs
- Achieved return on investment in under 1 year



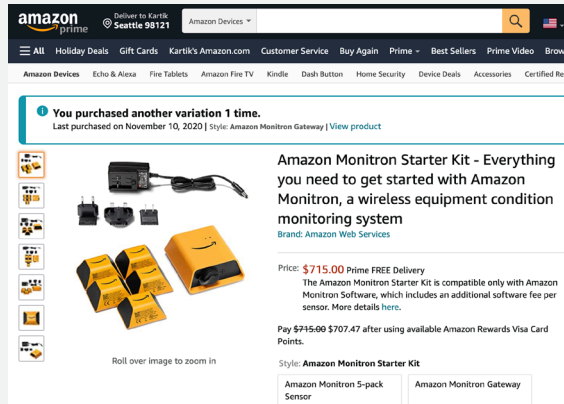
Using Amazon Monitron, technicians go from being reactive to proactive. You're no longer waiting for something to break down. You're already there planning and working on it.

Luke Grice-Lowe
Reliability Engineer,
Amazon Customer Fulfillment



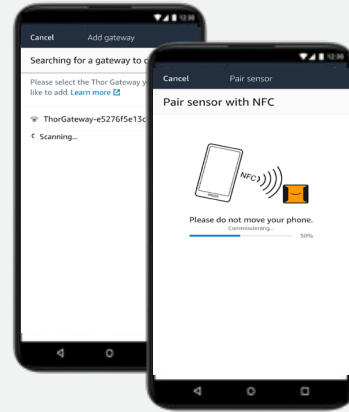
<https://www.youtube.com/watch?v=0XRjuX7WRt0>

Get started with Amazon Monitron



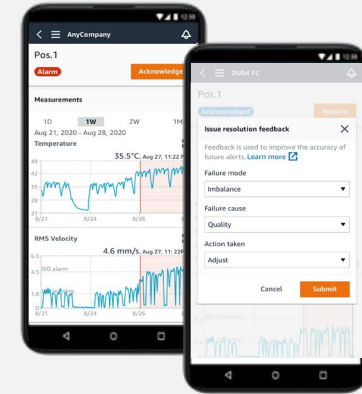
Purchase sensors and gateways

1. Buy sensors and gateways on Amazon.com or Amazon for Business



Configure and install

1. Create project in the Amazon Monitron console
2. Commission Amazon Monitron Sensors using the Amazon Monitron mobile app
3. Register the equipment
4. Pair Amazon Monitron Sensors to equipment



Monitor and manage

1. Amazon Monitron Sensors automatically connect to AWS and start monitoring the equipment
2. Get alerts whenever Amazon Monitron detects developing faults
3. Use the Amazon Monitron mobile or web app to view sensor measurements and provide feedback



Additional information

Watch how our customer Baxter is using Monitron to reduce their equipment downtime:

https://www.youtube.com/watch?v=xR_Mcecn5kk

Find out more about Amazon fulfillment center use case:

<https://www.youtube.com/watch?v=0XRjuX7WRt0>

Monitron How-To videos:

<https://broadcast.amazon.com/videos/272194>

<https://broadcast.amazon.com/videos/722734>

Monitron Blog:

<https://aws.amazon.com/blogs/machine-learning/generate-actionable-insights-for-predictive-maintenance-management-with-amazon-monitron-and-amazon-kinesis/>





Thank you!



Appendix

PROBLEM

Detecting potential failures of industrial equipment, such as compressors, is critically important as this reduces downtime and maintenance costs. Koch Ag & Energy Solutions (KAES) needed a way to detect these issues before they occurred.

Solution

KAES used Amazon Monitron and Amazon Lookout for Equipment – ML services that detect abnormal equipment behavior and promote predictive maintenance – to monitor industrial equipment including compressors.

Outcome

Amazon Monitron proactively detected a possible failure in a fan at a nitrogen producing facility by alerting on increased vibrations. This led KAES to swap fans and clean the inlet filter avoiding the risk of complete loss of air. Because of this, KAES avoided running lengthy maintenance workflows that are costly and cumbersome.



PROBLEM

For manufacturers worldwide, uptime of equipment is the only way to remain competitive in a global market. Unplanned downtime is costly both in loss of production and labor due to the reactive nature of the breakdown.

Solution

Ensuring that equipment is running and not being surprised by sudden breakdowns helps companies like Fender Musical Instruments Corporation get the most out of their equipment. Fender worked with AWS to help develop a critical and sometimes overlooked part of running a successful manufacturing business: knowing the condition of their equipment.

Outcome

Amazon Monitron helps Fender predict equipment failures and preemptively schedule equipment repairs.



“Amazon Monitron has the potential of giving both large industry as well as small ‘mom and pop shops’ the ability to predict failures of their equipment before a catastrophic breakdown shuts them down. This will allow for a scheduled repair of failing equipment before it breaks down.”

—**Bill Holmes, Maintenance Supervisor, Fender**

PROBLEM

With the emergence of IoT, organizations are bringing real-time condition monitoring capabilities into the factory environment to reduce reactive maintenance and improve asset reliability.

Solution

RS Components is working with AWS to bring Amazon Monitron to their customers to deploy a cost-effective condition monitoring solution and facilitate predictive maintenance across a broader set of equipment in their asset base.

Outcome

Customers will be able to adopt IoT and ML as emerging technologies and accelerate their Industry 4.0 strategies.



“We are constantly trying to innovate how we serve the maintenance needs of our customers. With the emergence of IoT, we have seen our customers looking to bring real-time condition monitoring capabilities into the factory environment to reduce reactive maintenance and improve asset reliability. We are excited to be partnering with AWS to bring Amazon Monitron to our customers because it allows them to deploy a cost effective, easy to use, continuously improving condition monitoring solution and enable predictive maintenance across a broader set of equipment in their asset base.”

—Richard Jeffers, Technical Director, RS Components