Top Use Cases for Industrial IoT Applications

The Internet of Things (IoT) emerged from the convergence of different technology trends. Thanks to broadband Internet becoming more widely available, the decreasing cost of connectivity, and more devices with Wi-Fi and sensors built in, industrial companies can create smart machines, connected equipment, and more. Currently, billions of devices are becoming connected and millions of developers are working on IoT projects. Analysts predict industrial IoT applications will make up 50% of total IoT spending by 2020.[1]

IoT is also changing how industrial customers operate. IoT is driving the shift from mass production to mass customization and the move away from big upfront capital expenditures to pay-as-you-go pricing. The opportunities for industrial IoT applications are endless. This eBook explores how to get started faster and reviews common IoT use cases.

Getting started fast with industrial IoT applications

When industrial companies get started building IoT applications, they are often concerned about data and device security, unexpected downtime, and onboarding legacy equipment. Getting the right security policies in place is challenging because IoT fleets are diverse, rapidly growing, long-lived, and geographically distributed. To further amplify security risks, many devices have a low-level of compute, memory, and storage capabilities, which limits opportunities for implementing security on devices.

Unexpected downtime is also a concern. When operations are stalled or stop completely, revenue is lost and quotas are missed. Moving to IoT applications means devices must be connected to the cloud, but not all locations have high speed Internet at all times.

Also, many industrial companies have made significant investments in operational technologies such as Supervisory Control and Data Acquisition (SCADA) systems. Operational technologies were designed and deployed to last a couple of decades, are deeply entrenched, and are very difficult to replace.

[1] Winning in IoT: It's All About the Business Processes
https://www.bcg.com/publications/2017/hardware-software-energy-environment-winning-in-iot-all-about-winning-processes.aspx

aws

AWS IoT helps industrial companies overcome challenges to attain business goals.

First, AWS IoT provides built-in device authentication and authorization to keep your IoT data and devices protected. You can also continuously audit security policies associated with your devices, monitor your device fleet for abnormal behavior, and receive alerts if something doesn't look right. You can even take corrective actions, such as powering off devices or pushing a security fix.

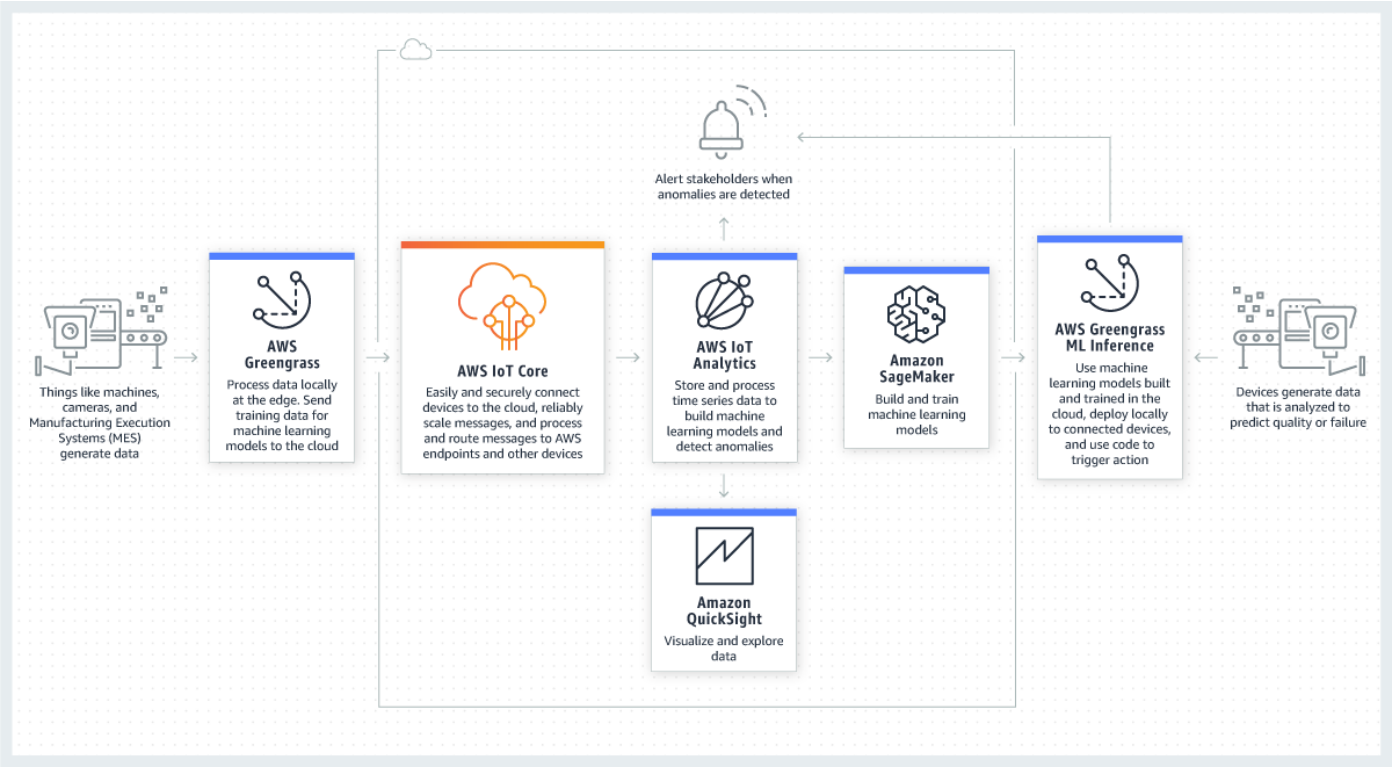
Second, AWS IoT enables connected devices to operate with intermittent Internet connectivity to mitigate risks of unexpected downtime. You can run machine learning models or software code and store data locally until Internet connectivity is available.

Third, AWS IoT lets you easily connect, manage, and update devices of any type from small microcontrollers, to more powerful gateway devices. You can integrate your existing legacy equipment on the manufacturing floor such as Programmable Logic Controllers (PLC) and Supervisory Control and Data Acquisition (SCADA) systems by deploying simple sensors to monitor processes and track key performance indicators without overhauling or replacing existing hardware.

AWS IoT provides capabilities so you can scale your IoT applications to thousands or millions of devices. With AWS IoT, you can organize device inventory, monitor your fleet of devices, and remotely manage devices across many locations including updating their software over-the-air (OTA).

Once devices are securely onboarded, AWS IoT offers an easy way to run analytics on IoT data. AWS IoT collects, processes, and analyzes IoT data quickly and easily so you can gain operational insights. AWS IoT integrates with Amazon SageMaker so you can build machine learning models and with Amazon QuickSight so you can visualize and explore data and share insights across teams. Machine learning models can run in the cloud or be deployed locally on devices.

Here's how it works



Top IoT use cases for industrial companies

Predictive quality

Predictive quality is used to spot and remediate quality issues fast. You can evaluate the state of industrial equipment continually to identify potential breakdowns before they impact production. The goal is to determine the right actions such as adjusting machine settings or doing additional worker training to improve quality.

For example, Kemppi used AWS to bring its IoT solution for its flagship welding machine to market and cut the cost of software development by approximately 50%.[1] The software lets the operator automatically apply welding parameters stored in the cloud, making the device easier to use for welders. It also authenticates users, so that welders only work on tasks they are qualified for. Finally, it saves information about every weld, so companies can prove they meet corporate standards.

> "With AWS, we got our product to market in six months instead of once a year, and we can now confidently release new code up to ten times a week instead of once each year."
>
> *Juhana Enqvist*
> *Chief Digital Officer, Kemppi*

[1] https://aws.amazon.com/solutions/case-studies/kemppi/

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Predictive maintenance

Predictive maintenance predicts failure before operations are impacted. You can capture the state of industrial equipment to identify potential breakdowns before they impact production. Knowing when equipment needs attention helps you plan maintenance work, keep the right inventory, and avoid outages.

For example, EMS uses AWS IoT to detect fuel leaks early to minimize environmental impact. EMS delivered a 500% ROI using AWS IoT software and services.[1]

> With our AWS IoT–enabled Fuelsuite solution, customers manage their petrol stations proactively rather than reactively… to dramatically improve efficiencies and detect fuel leaks early to minimize environmental impacts.

Russell Dupuy
Founder and Managing Director, EMS

[1] https://aws.amazon.com/solutions/case-studies/ems/

Asset condition monitoring

Asset condition monitoring captures the state of your machines and equipment so you can understand how the asset is performing. Typically, data such as temperature, vibration, and error codes indicate if the equipment usage is optimal, but it's hard to capture manually since technicians need to go physically inspect equipment and machines.

Sending device health indicators to the cloud lets operations staff know about underused capability or overused resources.

For example, Centratech Systems was seeking ways to save time, money, and energy in the field, where technicians spend their days driving around to physically maintain devices such as water pumps and electricity meters. They needed a more convenient way for field technicians to monitor devices across a broad territory from their trucks, without physically inspecting each device or having specialized equipment on hand.

Using AWS IoT, they are able to remotely monitor devices for electricity and water management. As a result, they were able to reduce training time for new customers from 6 hours to 1 hour and have vastly expanded their customer base through an estimated 66% reduction in device costs. AWS IoT lets them manage newer, lighter, and less costly smart devices in the field.[1]

> "Working with AWS has changed our business. It shines a light on new technology and ways of working."
>
> *Richard Freedman*
> *Managing Director, Centratech Systems*

[1] https://aws.amazon.com/solutions/case-studies/centratech_systems/

AWS IoT partner ecosystem: Get started faster

AWS IoT has a broad partner ecosystem to help jumpstart your IoT project or improve what's already in market. Many of our customers are working with partners to not only form an Industrial IoT strategy, but also implement, deploy, and manage the IoT project to success. Partners play a significant role making IoT projects successful from securing the right strategy and resources to setting a positive course of action. Partners offer specialized skills used to build strategies, design and architect solutions, implement and deploy IoT solutions, manage and maintain IoT systems, offer technical consultation and support, and provide a clear path to gain the intelligence needed for real business outcomes. AWS offers a broad partner ecosystem from which to choose technology or consulting partners to help you be successful with your IoT projects. Visit AWS IoT Partner Solutions (https://aws.amazon.com/iot/partner-solutions/) to learn more.

Learn more about AWS IoT

At AWS, our mission is to make sure that you can know the state of every ***thing*** and that you can reason on top of that data to solve business problems.

Edge-Based Software »

Amazon FreeRTOS
IoT Operating System for Microcontrollers
https://aws.amazon.com/freertos/

AWS Greengrass
Secure Local Triggers, Actions, and Data Sync
https://aws.amazon.com/greengrass/

Cloud-Based Services »

AWS IoT Core
Secure Device Connectivity and Messaging
https://aws.amazon.com/iot-core/

AWS IoT Device Management
Fleet Onboarding, Management,
and Software Updates
https://aws.amazon.com/iot-device-management/

AWS IoT Device Defender
Fleet Audit and Protection
https://aws.amazon.com/iot-device-defender/

AWS IoT Analytics
IoT Data Analytics and Intelligence
https://aws.amazon.com/iot-analytics/

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