



# AWSOME DAY

ONLINE CONFERENCE

16 NOVEMBER 2023 | APJ

# Innovation with AWS

Jack Romanous

Technical Trainer  
Amazon Web Services





# Internet of Things (IoT)



# What is the Internet of Things (IoT)?



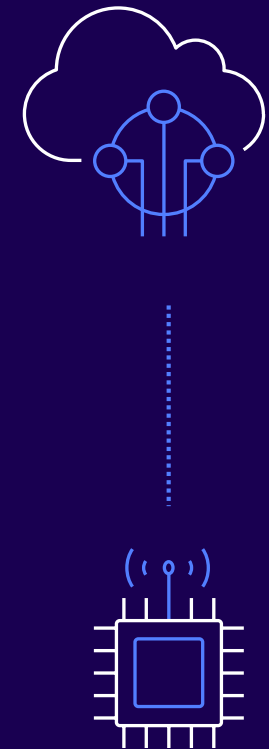
The Internet of Things (IoT) is where a system of integrated devices, such as appliances, watches, or features in a car, can be connected to various applications

These connections enable data to be transferred to and from devices in a bidirectional communication flow over a network

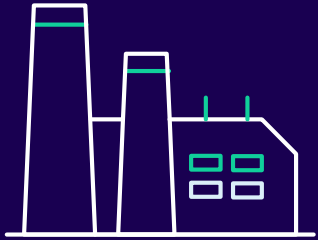
# Challenges of managing “things”

Managing IoT devices poses a number of challenges

- Management and updates
  - Inconsistent or intermittent network connectivity
  - Remote devices that may not be physically accessible
  - Large fleets of devices in production
- Analytics
  - Low compute power, low-spec on-device resources
  - Devices may emit large quantities of streaming data



# What customers are doing with AWS IoT



Improve the performance and productivity of industrial processes



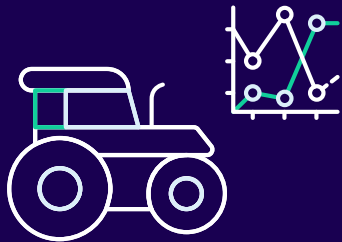
Remotely monitor patient health & wellness applications



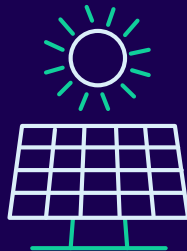
Track inventory levels and manage warehouse operations



Build smarter products & user experiences in homes, buildings, and cities



Grow healthier crops with greater efficiencies



Manage energy resources more efficiently



Transform transportation with connected and autonomous vehicles



Enhance safety in the home, the office, and the factory floor

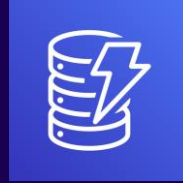
# AWS IoT core: Rapid development



**AWS IoT Core**  
Connect devices  
to the cloud



**AWS Lambda**  
Run code in  
response to events



**Amazon DynamoDB**  
Predictable & scalable  
NoSQL data store



**Amazon Kinesis**  
Streaming  
analytics



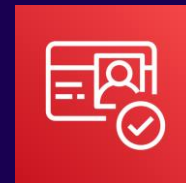
**Amazon API Gateway**  
Build, deploy, and  
manage APIs



**Amazon Redshift**  
Petabyte-scale  
data warehouse



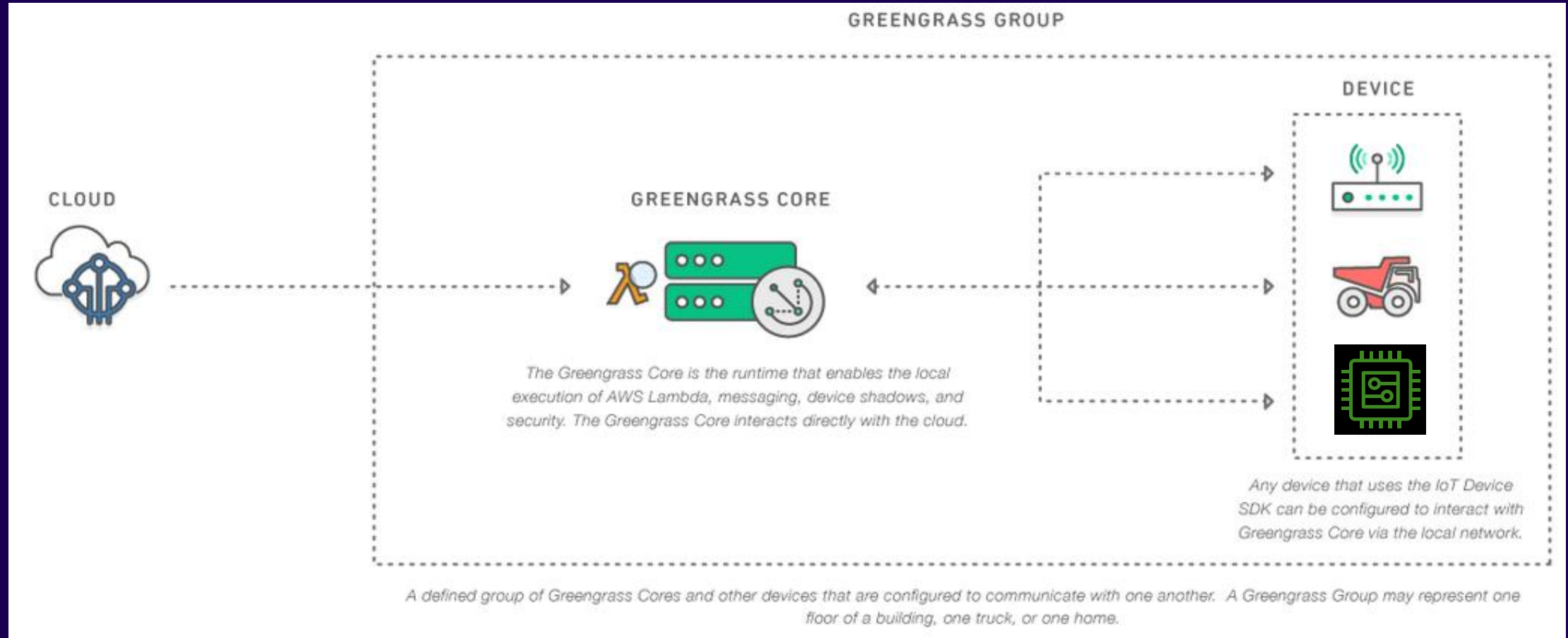
**Amazon SNS**  
Mobile push  
and notifications



**Amazon Cognito**  
User identity and data  
synchronization

...and more

# AWS IoT Greengrass







# Bayer CropScience



## Problem

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In the seed business, it's important to gain better and faster visibility into what's going on in fields during planting and harvest within breeding research and supply chain organizations.

## Solution

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AWS IoT helps Bayer Crop Science manage the collection, processing, and analysis of seed-growing data. Data analysts use the new data collection platform to access data on their mobile devices via dashboards. The solution captures multiple terabytes of data from seed transportation, planting, and growing in the company's research fields across the globe.

## Impact

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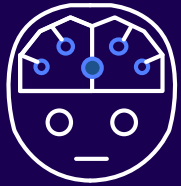
Using AWS IoT, Bayer Crop Science can provide seed data to analysts in just a few minutes instead of a few days. This also helps farmers gain better visibility into field conditions and provides a robust edge processing and analytics framework.

# Machine learning



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# What is machine learning?



## Artificial intelligence (AI)

Any technique that enables computers to mimic human intelligence using logic, if-then statements, and machine learning (including deep learning)



## Machine learning (ML)

Subset of AI that uses machines to search for patterns in data to build logic models automatically



## Deep learning

Subset of ML composed of deeply multi-layered neural networks that perform tasks like speech and image recognition



# Amazon's machine learning innovation

## Recommendations for you



Your Orders



Pet Supplies



Beauty & Personal Care



Tools & Home Improvement

**4,000 products per minute** sold on Amazon.com



**1.6 million packages** every day



**Billions of Alexa** interactions each week

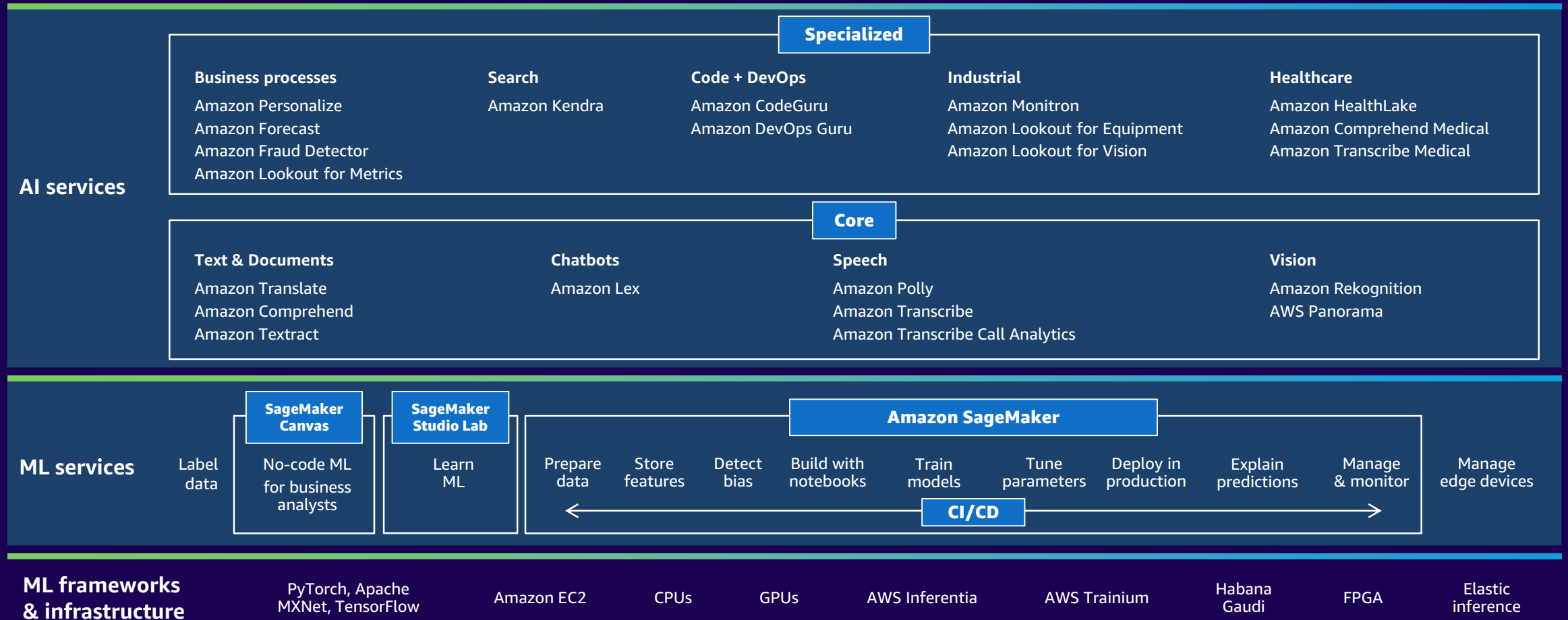


**First Prime Air delivery** on **Dec. 7, 2016**



# The AWS AI/ML stack

Broadest and most complete set of machine learning capabilities



# Amazon SageMaker overview



## Amazon SageMaker

### Prepare →

- SageMaker Ground Truth
- SageMaker Data Wrangler
- SageMaker Processing
- SageMaker Feature Store

### Build →

- SageMaker Studio notebooks
- Built-in and bring-your-own algorithms
- Local mode
- SageMaker Autopilot

### Train & tune →

- One-click training
- SageMaker Experiments
- Automatic model tuning
- SageMaker Debugger
- Managed spot training

### Deploy & manage →

- One-click deployment
- Kubernetes & Kubeflow integration
- Multi-model endpoints
- Model Monitor
- SageMaker Pipelines

### SageMaker Studio

Integrated development environment (IDE) for ML



## PROBLEM

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3+ terabytes of data, 1,500+ hours of play time per week

Needed a solution for real-time stats

Lean team, no data science expertise

## SOLUTION: NEXT GEN STATS

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Engaged with Amazon ML Solutions Lab

Live data streamed to AWS from RFID tags on players and in game ball

Data processed in 100+ steps in under 1 second

ML models built on Amazon SageMaker make predictions in real time

## IMPACT

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Launched 20+ stats quickly with limited data science team

Sports announcers get interesting data points to engage fans

# **Demo: Natural Language Processing with Amazon Transcribe and Comprehend**





# Blockchain



# What is blockchain?

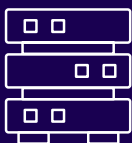


Blockchain makes it possible to build applications where multiple parties can execute transactions **without the need for a trusted, central authority**

Today, building a scalable blockchain network with existing technologies is complex to set up and hard to manage



## Each network member needs to



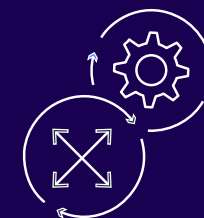
## Manually provision hardware



## Install software

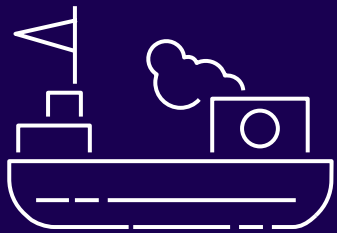


## Create & manage certificates for access control



## Configure networking components

# Example use cases



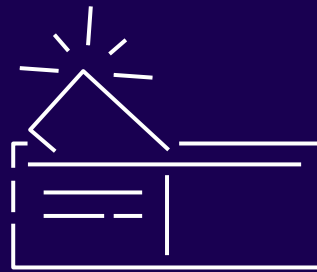
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**Shipping**



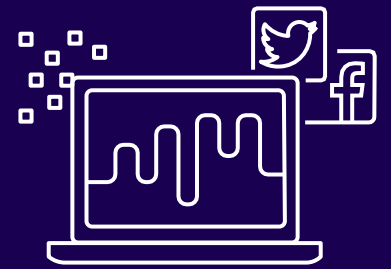
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**Supply chain  
management**



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**Finance  
and banking**

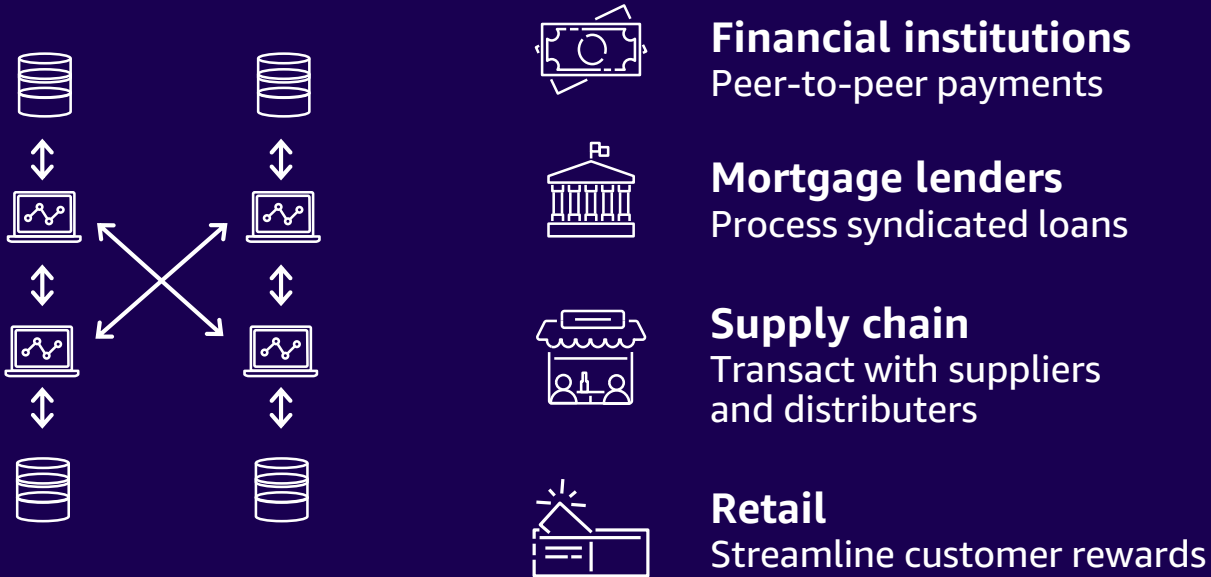


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**Digital  
advertising**

# Blockchain qualities

## Decentralized trust



## Benefits

Transparency

Immutability

Auditability

Permissionless

Permissioned

Consortium



# AWS blockchain services

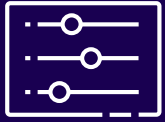


Amazon  
Managed  
Blockchain

Fully managed service that makes it easy to create and manage scalable blockchain networks using popular open-source frameworks

- Hyperledger Fabric
- Ethereum

# Amazon Managed Blockchain features



## Fully managed

Create a blockchain network in minutes



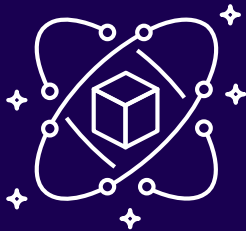
## Open-source variety

Support for two frameworks



## Decentralized

Democratically govern the network



## Reliable and scalable

Backed with Amazon QLDB technology



## Low cost

Only pay for resources used



## Integrated

With AWS services

# Nestlé's chain of origin coffee cultivates supply chain transparency with Amazon Managed Blockchain

## Challenge

Nestlé is the biggest procurer of coffee in the world, and it wanted to uncover transparency around its coffee bean supply chain beyond its brokers and buyers

## Solution

Nestlé turned to Amazon Managed Blockchain to trace back through every step in its supply chain – from the farmer and grader to the roaster and packer

## Benefits

- Nestlé can now grow one-on-one relationships with coffee farmers and roasting facilities
- Because the secure blockchain ledger is public, it provides greater accountability to everyone in the supply chain

“Whether it's how we ensure freshness, whether it's making sure that the packaging being used is better for the planet, **it means that the value is going back to the farmers and the partners we're working with.**”

Armin Nehzat, Digital Technology Manager, Nestlé



**Company:** Nestlé  
**Country:** Switzerland (CH)

**Employees:** 300,000+

**Website:** [Nestle.com](https://www.nestle.com)

## About Nestlé

Nestlé is the world's largest food and beverage company. It is present in 190 countries around the world, and it has 308,000 employees. Nestlé is also the biggest procurer of coffee globally.

# AWS Ground Station



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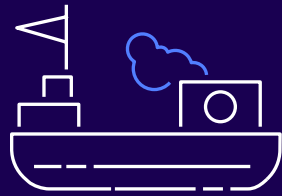


# Common satellite data cloud processing use cases



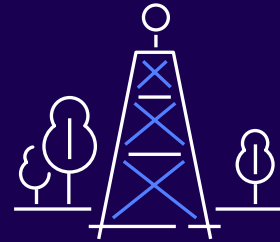
## Weather forecasting and agriculture

Commercial fruit producers can monitor crop health and water levels to ensure efficient use of limited resources



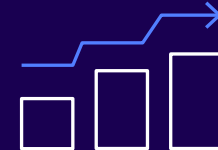
## Global shipping and anti-piracy

Use registries of ship placement, destination, and tracking to confirm accuracy of ship positioning, as well as be notified of any deviations from normal operations



## Earth observation and fire safety

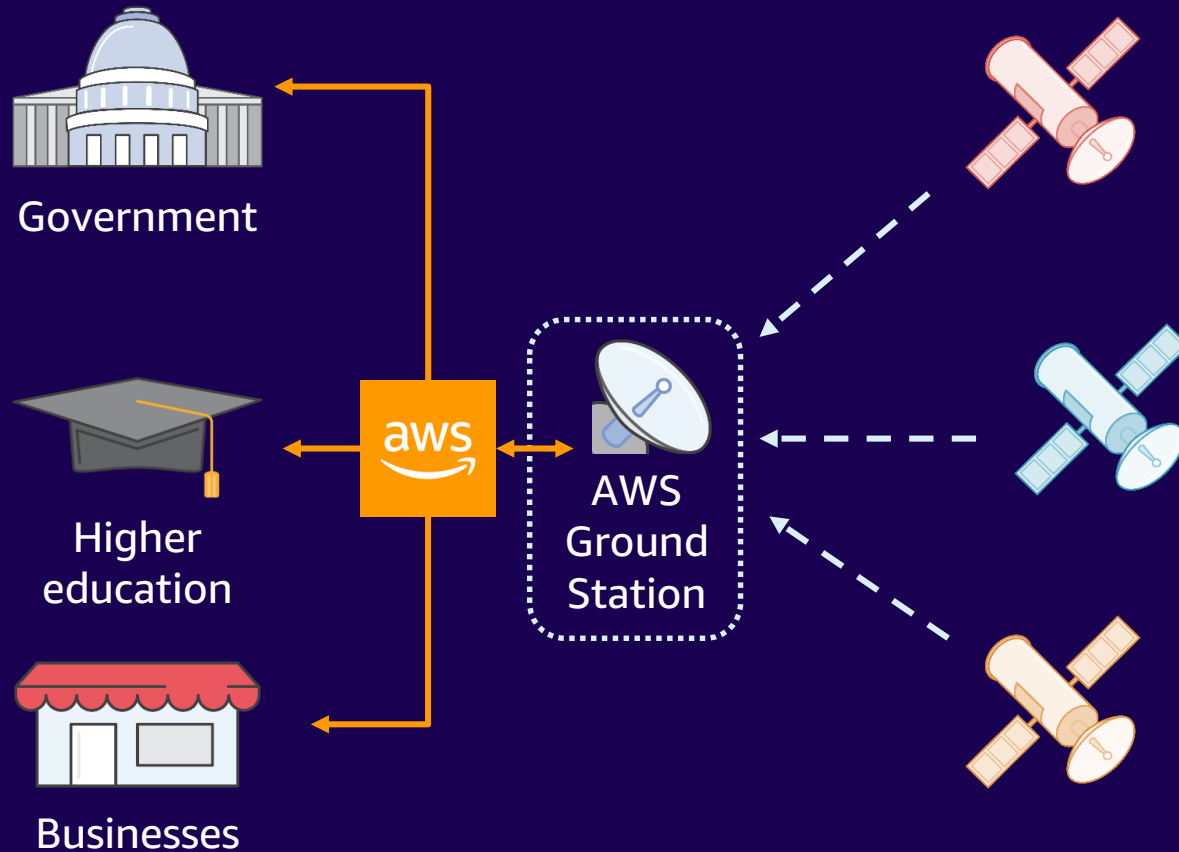
Use low-latency access to high-resolution heat mapped images of the earth to inform frontline fire commanders on safest, lowest heat entry points to fight fires



## Retail forecasting

4.8 million satellite images from 44 major US retailers confirms numbers of cars in parking lots and yields an informational advantage to forecasting accuracy

# What AWS Ground Station offers



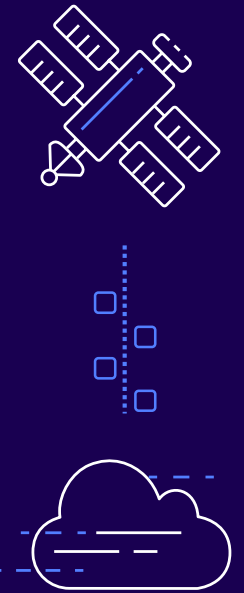
- Satellite ground support with no infrastructure commitments
- Pay-by-minute pricing
- Self-service scheduling
- Collocated ground stations and AWS data centers providing direct access to AWS resources and services
- Backhaul of base band data to customer Region of choice included in pricing
- Near-real-time data delivery

# AWS Ground Station: What is it?

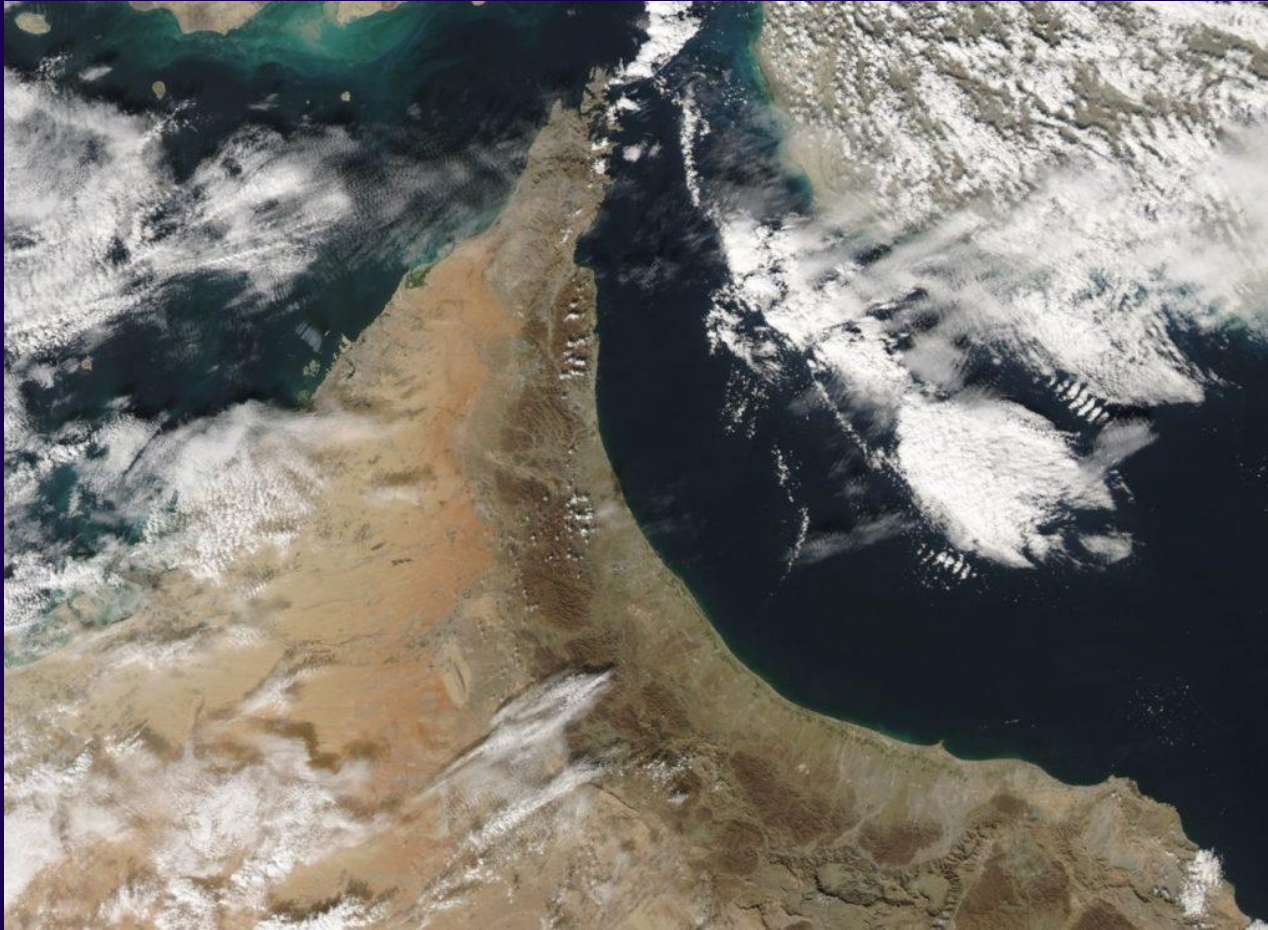
**AWS Ground Station** is a fully managed service that you can use control satellite communications, process data, and scale operations without having to worry about building or managing your own ground station infrastructure

These facilities provide communications between the ground and the satellites in space

- Low-latency global fiber network
- Direct access to AWS services
- Fully managed service (no infrastructure commitments)
- Pay-as-you-go pricing
- No licensing requirements
- Scale satellite communications on demand when your business needs it



# Earth observation using AWS Ground Station: A how to guide



## Output from Blog

Cropped True Colour Corrected Reflectance  
(CREFL) image

Captures the UAE and Oman

Produced using IPOPP's CREFL SPA

<https://aws.amazon.com/blogs/publicsector/earth-observation-using-aws-ground-station/>



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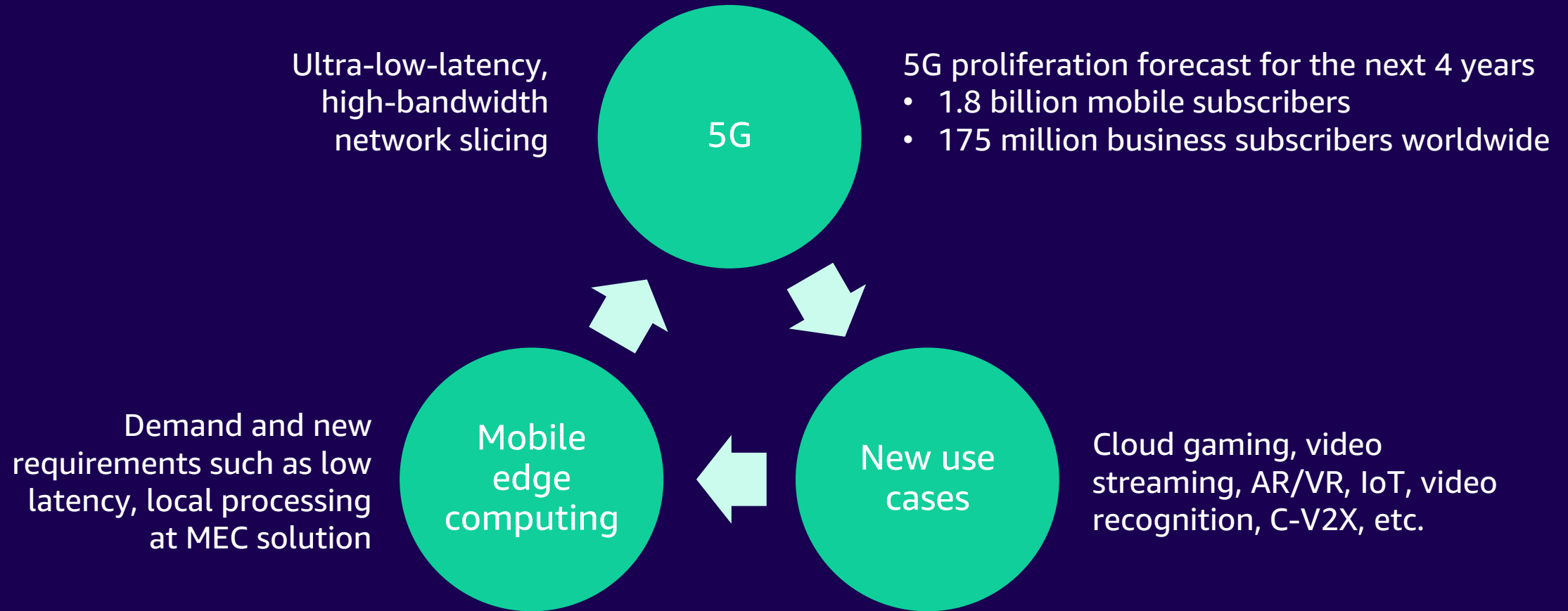
# AWS Wavelength



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# 5G and mobile edge computing

Mobile service delivery model that is consumer- and business-focused



# AWS Wavelength



AWS Wavelength combines the high bandwidth and ultra-low latency of 5G networks with AWS compute and storage services to help developers innovate and build a whole new class of applications

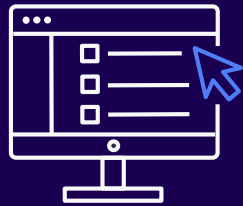
- AWS infrastructure and services in CSP 5G networks
- Ultra-low latency, local data processing
- Scalable capacity in CSP data center managed and supported by AWS

# AWS Wavelength: Built for the mobile edge

AWS services from inside the CSP mobile network



AWS compute and storage infrastructure embedded inside CSP mobile network



Single pane of management, across Wavelength Zone and AWS Regions



Access to services in the AWS Region



Develop applications once and deploy for use with 5G network globally



Failover from Wavelength Zone to AWS Region

# AWS Wavelength use cases

## Healthcare



AI/ML solution for processing and analyzing video, images, and data for real-time diagnosis

## Connected vehicles (C-V2X)



Real-time monitoring of data from sensors for road safety, secure connectivity, in-car telematics, and autonomous driving

## Smart factory



Accelerating the industrial edge with AI/ML, video recognition for software-defined manufacturing



# LG uses AWS Wavelength for low-latency, high-throughput delivery of V2X data



“5G gives us that connectivity piece with high bandwidth and low latency, while **Wavelength is providing the necessary compute power at the edge to supplement the 5G technology.** So, it’s about bringing security, privacy, connectivity, and compute together for the benefit of consumers and their safety.”

**Harsh Kupwade Patil,**  
Security Leader & Principal Research Engineer, LG Electronics



# Thank you for attending AWSome Day Online Conference

We hope you found it interesting! A kind reminder to **complete the survey**.  
Let us know what you thought of today's event and how we can improve the event experience for you in the future.



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# Thank you!

