AWS re:Invent

NOV. 29 – DEC. 3, 2021 | LAS VEGAS, NV

IOT207-L

Closing the loop: Innovating with IoT on AWS

Michael MacKenzie (he/him)
General Manager, Industrial IoT and Edge, AWS IoT
Amazon Web Services

© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

We continue to innovate with our customers

December—re:Invent 2020

AWS IoT Core for LoRaWAN

AWS IoT Greengrass 2.0

AWS IoT EduKit

Fleet Hub for AWS IoT Device Management (preview)

AWS IoT Device Defender ML Detect (preview)

AWS for Industrial

© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

We continue to innovate with our customers

January 2021

AWS RoboMaker

Amazon Kinesis Video Streams

AWS IoT Device Client onboarding

© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

We continue to innovate with our customers

February 2021

IoT Static IP Endpoints solution

Troubleshooting for AWS IoT Events

© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

We continue to innovate with our customers

March 2021

AWS IoT Core Configurable Endpoints and Custom Domains (GA)

AWS IoT Device Defender ML Detect (GA)

FreeRTOS achieves SESIP security certification

© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

We continue to innovate with our customers

April 2021

AWS IoT Device Defender ML Detect (GA)

Machine to Cloud Connectivity Framework v2.2

Linear interpolation in AWS IoT SiteWise

© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

We continue to innovate with our customers

May 2021

Machine Downtime Monitor solution

AWS IoT Core Device Advisor (GA)

Fleet Hub for AWS IoT Device Management (GA)

Alarms for AWS IoT SiteWise and Events

© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

We continue to innovate with our customers

June 2021

Discovery Recovery for AWS IoT Solution

LoRaWAN gateway management features for AWS IoT Core for LoRaWAN

FreeRTOS—Symmetric Multiprocessing (SMP) support

© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

We continue to innovate with our customers

July 2021

AWS IoT Core Dataplane VPC Endpoints Support

AWS IoT Greengrass integration with Amazon SageMaker Edge Manager for edge ML inference

Amazon Virtual Andon 2.2 solution

AWS IoT SiteWise Edge (GA)

© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

We continue to innovate with our customers

August 2021

AWS Snow Family supports ML inference at the edge with Amazon SageMaker Edge Manager and AWS IoT Greengrass

AWS IoT Device SDK for Embedded C

AWS IoT Greengrass—support for Yocto Embedded Linux

AWS IoT Analytics in Mumbai region

© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

We continue to innovate with our customers

September 2021

AWS IoT Device Defender audit one-click

AWS IoT SiteWise now in AWS GovCloud region

© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

We continue to innovate with our customers

October 2021

AWS IoT SiteWise in Mumbai, Seoul, and Tokyo regions

AWS IoT Events in Mumbai

© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

We continue to innovate with our customers

November 2021

AWS IoT Greengrass native support for Windows

AWS IoT Jobs managed Job templates

FreeRTOS Cellular Library GA

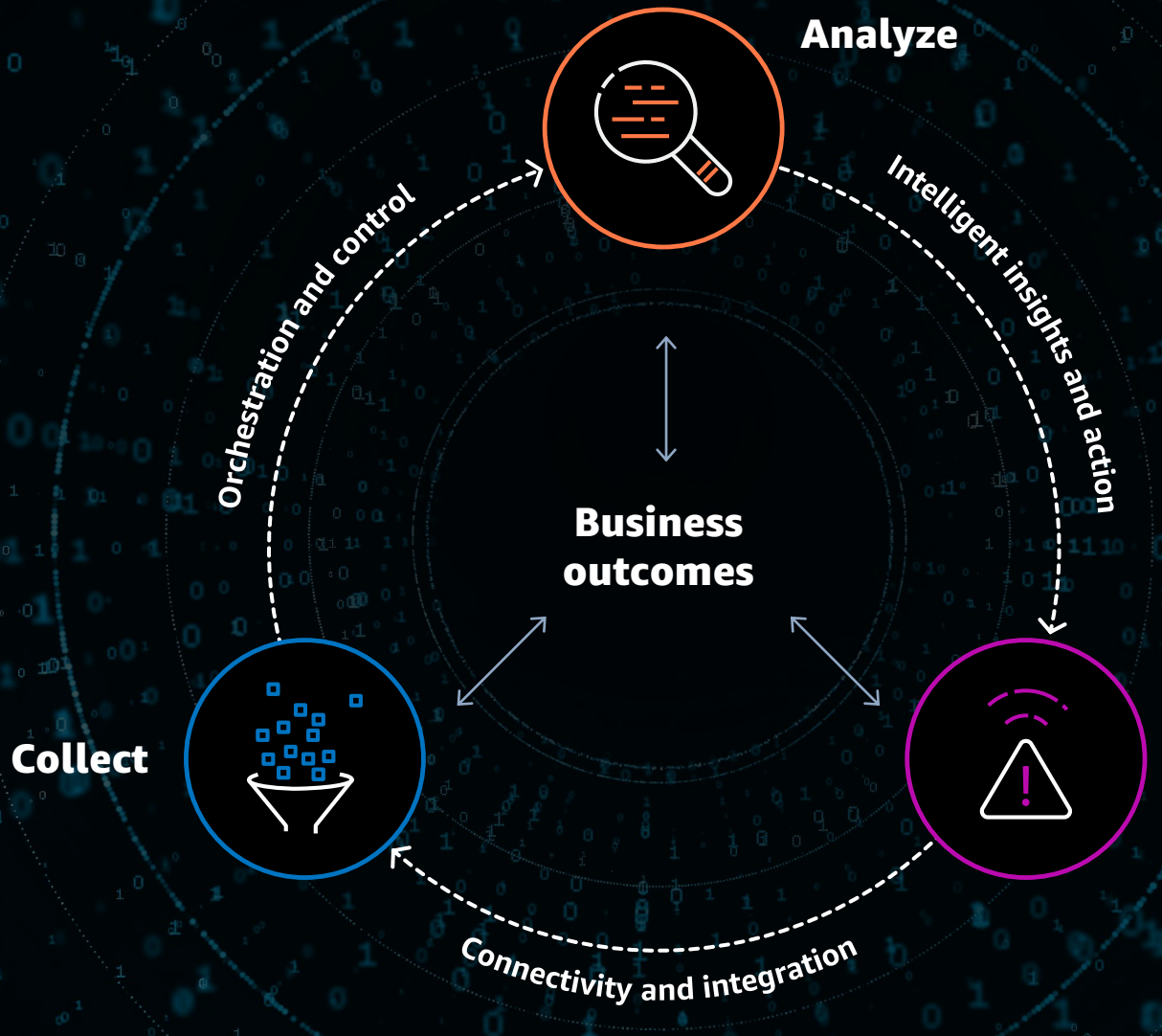
Expanded Greengrass Software Catalog for edge computing

IoT Core for LoRaWAN Network Analyzer

FreeRTOS Extended Maintenance Plan for support up to 10 years

© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

The use of IoT is evolving . . .



© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Digital transformation is disrupting everything

. . . and IoT is one of the technologies enabling that

© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

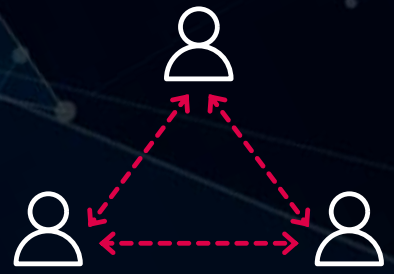
We are enabling customers to innovate



YARA



KONE



Waters

THE SCIENCE OF WHAT'S POSSIBLE



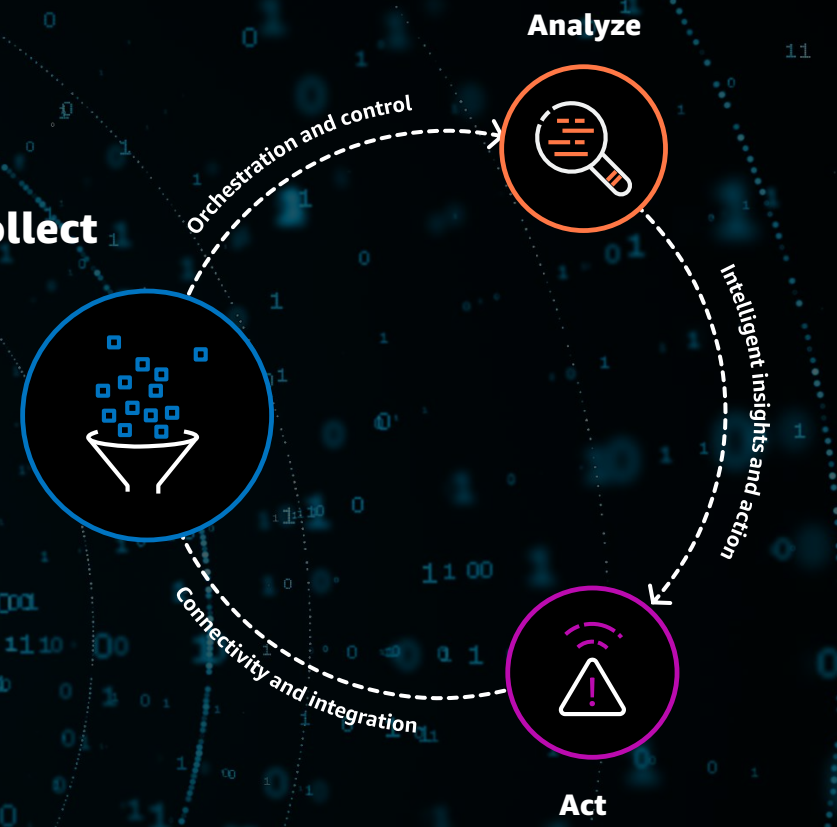
Blueair

aws

© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Challenge

How do I seamlessly integrate new devices into my applications?

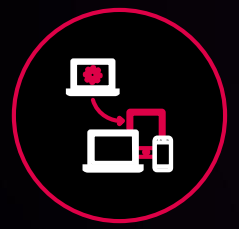


© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

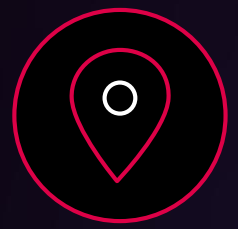
It’s challenging to integrate devices at scale



Securely



At scale



Remotely



In real time

© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

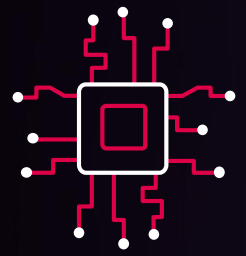
AWS IoT ExpressLink

QUICKLY AND EASILY DEVELOP SECURE IOT DEVICES

Preview!



Easily connect devices to the cloud



Flexibility to connect devices of all types



Maintain fleet health and security at scale

© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.



Objective: Revolutionize plant care by transforming indoor gardening products into smart home devices

Solution: Use AWS IoT ExpressLink to enable secure and reliable cloud connectivity of their products

Results: Accelerate their product development by connecting devices in days instead of months

© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Challenges to system-level optimization

Control systems from different robots **are not easily integrated**

Deploying robots often requires **complex software integration**

Robotics applications for optimization can be **difficult to build**

© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

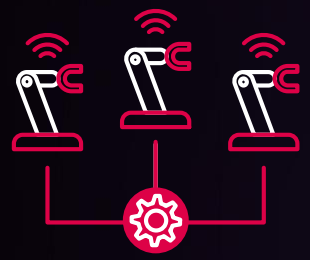
AWS IoT RoboRunner

BUILD APPLICATIONS THAT HELP ROBOT FLEETS WORK TOGETHER SEAMLESSLY

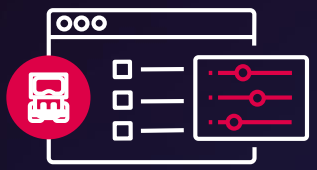
Preview!



Enable robot interoperability



Connect to a common management system



Build robotics applications faster

aws

© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Objective: Build an intelligent and scalable fleet-management solution for multiple types of robotic assets

Solution: AWS IoT RoboRunner enabled the integration of robots with AGCO's enterprise systems to enable the use of predictive analytics

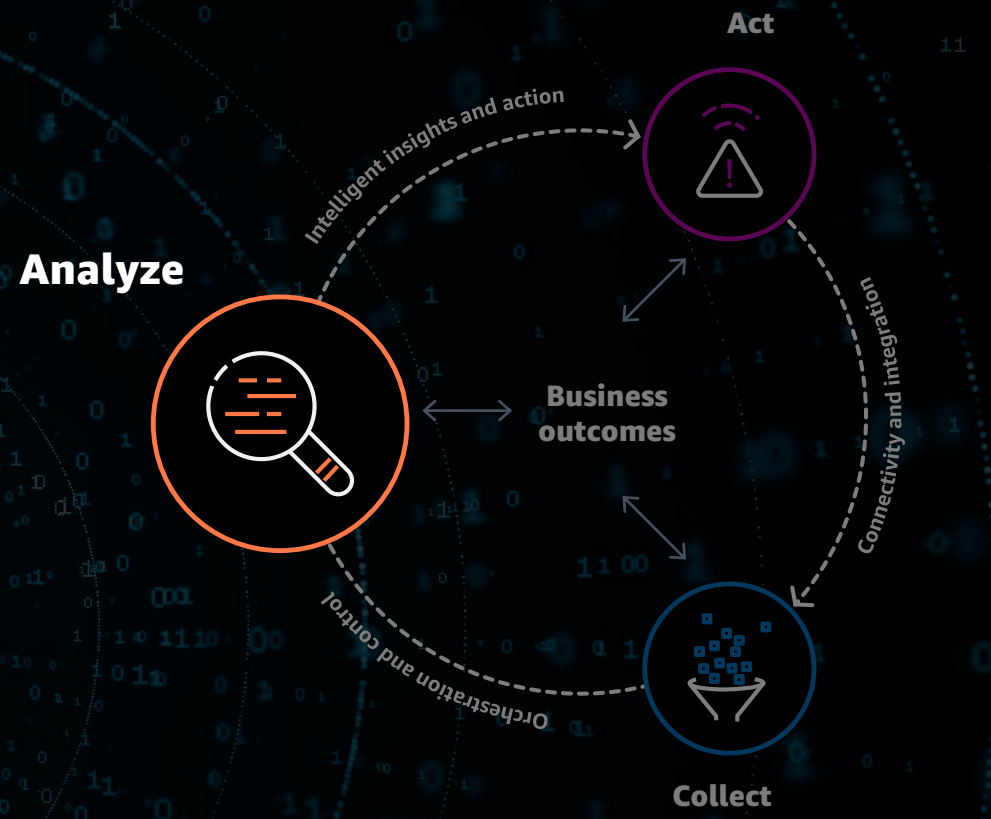
Results: Improved the efficiency of equipment used for material handling, reducing process times and improving on-time delivery



© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Challenge

How do I generate actionable insights and put them in the hands of the people who need them?



© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

What are the considerations?



Where?



How much?



How advanced?



Delivery?

© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

We created tools to help customers create intelligent, actionable insights

Techno Brazing	CCI	bpx energy	Lyell
70% decrease in unplanned production downtime	Rules and alerts managing petabytes of data	Real-time intelligent decision making based on well data	Visualize cell therapy telemetry data in near real time
AWS IoT Greengrass	**AWS IoT SiteWise**	**Amazon SageMaker**	**AWS IoT SiteWise Monitor**

aws

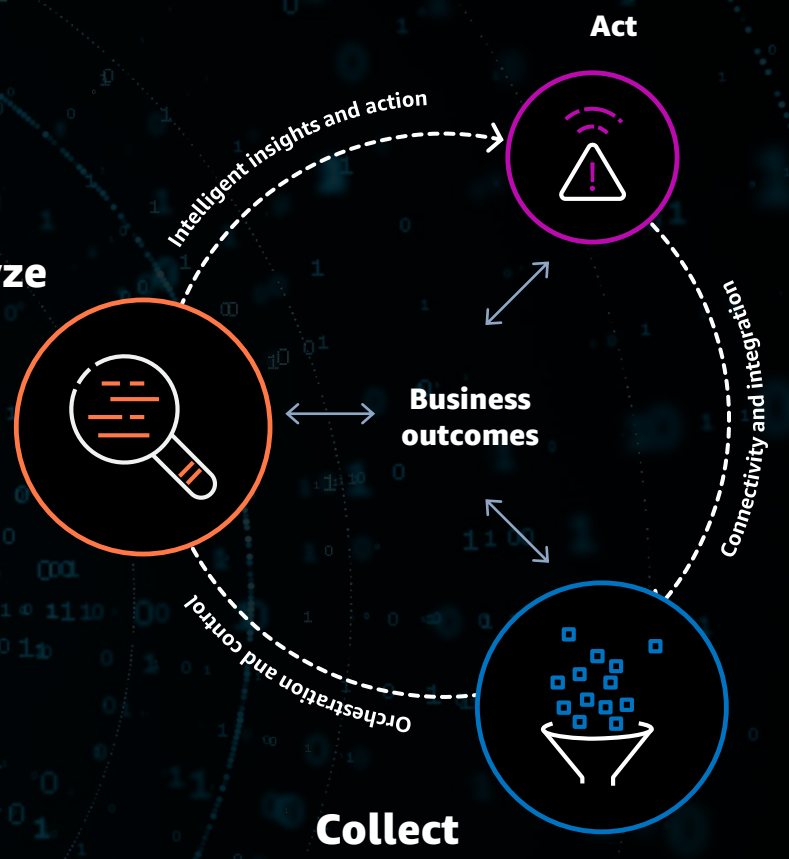
© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Lockheed Martin

© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Challenge

How do I manage diverse fleets with massive amounts of data?



© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

The automotive industry is changing

Hardware



Software

Connectivity



NXP

Data

Interoperability



otonomo

© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Data is the key to unlocking new opportunities



New revenue streams

Integrated vehicle-to-cloud mobility services



Delight customers

Personalized and continuously updated in-vehicle experiences



Competitive advantage

Higher operational efficiency of global fleets

aws

© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Challenges with managing vehicle data efficiently



Data access

Each vehicle model's unique and proprietary data format requires building custom data collection systems



Data volume

Higher levels of vehicle autonomy generate vast amounts of data from advanced sensors like radars and cameras, which make cloud data transfer cost-prohibitive



Data timeliness

Data comes too late for automakers to quickly mitigate fleet-wide problems or provide customers with preventative maintenance

aws

© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

AWS IoT FleetWise

EASILY COLLECT, TRANSFORM, AND TRANSFER VEHICLE DATA TO THE CLOUD IN NEAR-REAL TIME

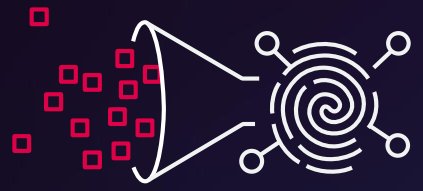
Preview!



Easily access standardized, fleet-wide vehicle data



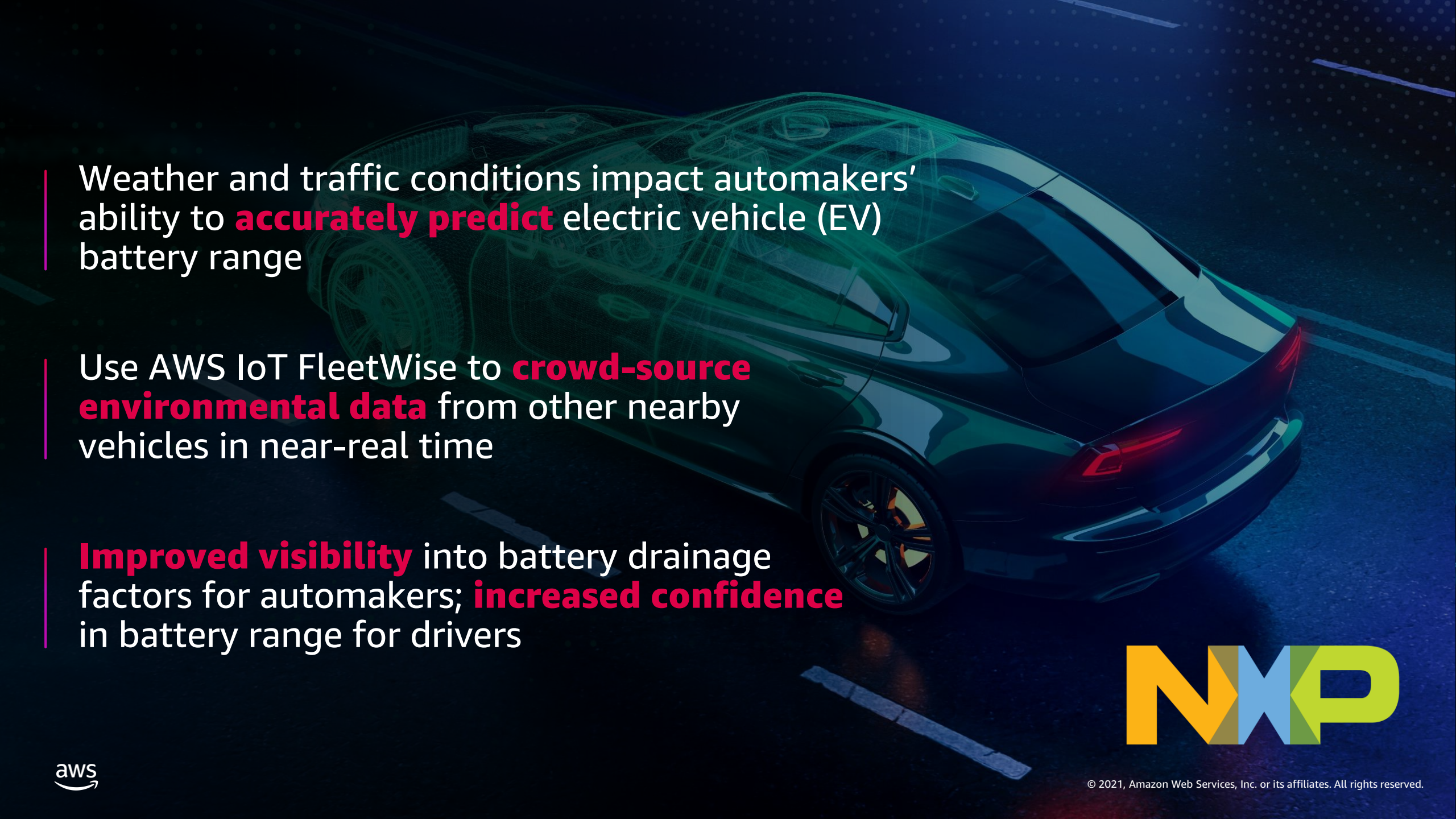
Reduce costs and improve the signal-to-noise data ratio with intelligent data filtering



Detect and mitigate problems more quickly with near-real time vehicle data

aws

© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.



Weather and traffic conditions impact automakers' ability to **accurately predict** electric vehicle (EV) battery range

Use AWS IoT FleetWise to **crowd-source environmental data** from other nearby vehicles in near-real time

Improved visibility into battery drainage factors for automakers; **increased confidence** in battery range for drivers

© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Challenge

How do I make it easier to take action?



© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Digital twins

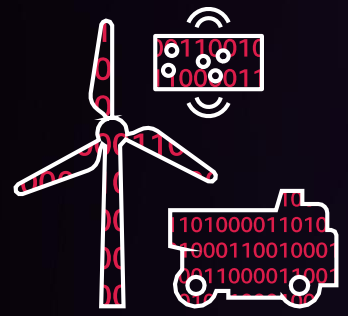
A living **digital representation** of a **physical system** that is **dynamically updated** to mimic the structure, state, and behavior of the physical system and used to drive **business outcomes**

© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Three key challenges to building digital twins



Accessing physical system data



Creating living digital representations



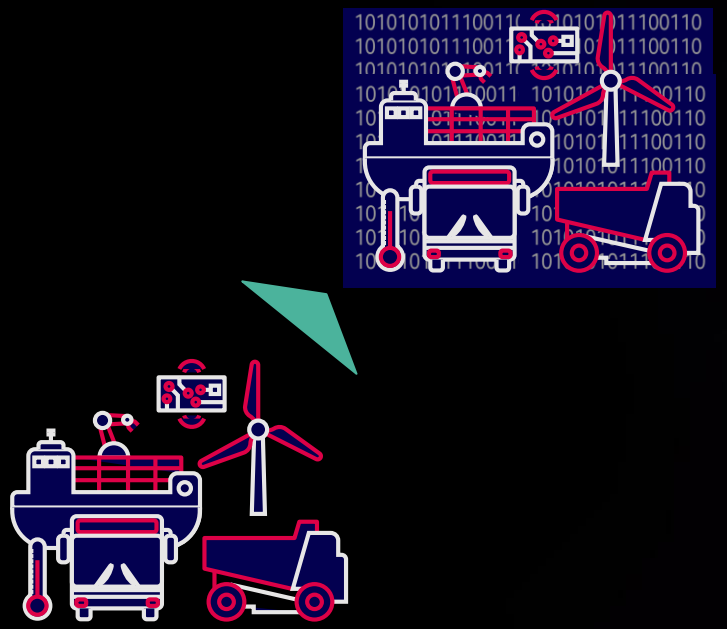
Driving optimal outcomes

© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

AWS IoT TwinMaker

OPTIMIZE OPERATIONS BY EASILY CREATING DIGITAL TWINS OF REAL-WORLD SYSTEMS

Preview!



Easily access data no matter where it lives

Accurately model your built environment

Create immersive 3D views

aws

© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.



Objective: Optimizing manufacturing operations by existing their vision of the connected worker

Solution: Use AWS IoT TwinMaker to build an operational digital twin to remotely pinpoint areas requiring field attention

Results: Improved productivity and efficiency in field operations as well as environmental, health, and safety excellence

aws

© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

SIEMENS

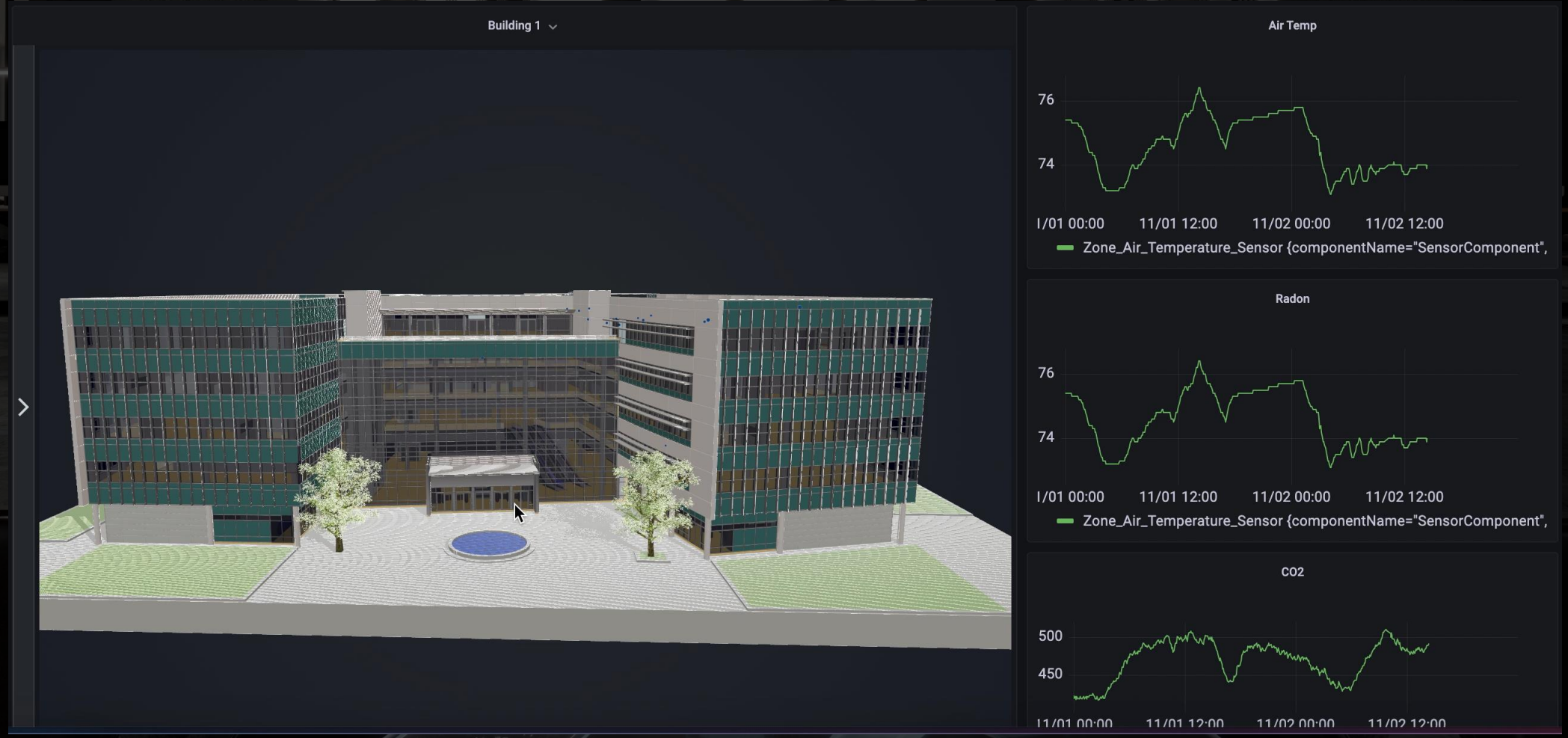
A leader in software for creating **comprehensive digital twins** for design, manufacturing, and service

Integrating AWS IoT TwinMaker with the Siemens **Xcelerator portfolio**

Together, delivering **new digital twin solutions** that scale from the most simple to the most complex use cases

aws

© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.



Allow **3D visualization of connected spaces** within Carrier's Abound platform for building owners and operators

Use AWS IoT TwinMaker to **create digital twins** – relating operational data and insights to spatial context of each building

Streamline decision making and corrective action

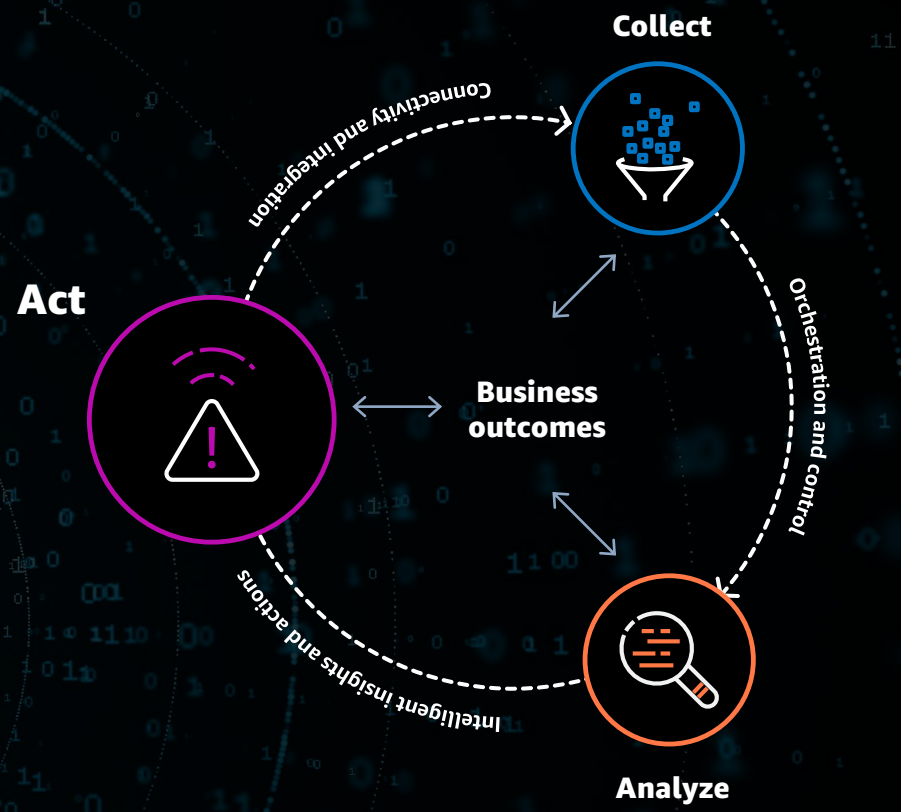
aws

Carrier

© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

How Carrier

. . . is closing the loop with AWS IoT



Bobby George
SVP and CDO, Carrier

© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Carrier is at the center of large societal change



HEALTHY SPACES



CLIMATE CRISIS



SAFE DISTRIBUTION



DIGITALIZATION



CONNECTIVITY

© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

State of the building industry

40%
of carbon emissions due to built environment

70%
of world's population is shifting to urban locations

80%
of consumers value sustainability

Energy retrofit rates in buildings are **less than 1%** in most major markets

90%
of our time is spent indoors

If adopted, smart building tech stands to reduce global carbon emissions by **up to 15% by 2030**

References: World Green Building Council, EPA, Fortune, IBM & National Retail Federation, IEA, Ericcson

© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Industry disruption

Barriers to adoption

- Siloed systems
- Proprietary technologies
- Snowflake buildings
- Proving ROI
- Up-front costs

Enablers to change

- Normalization of AI + ML
- Connectivity standards
- Lower cost of sensors
- Reduced size of tech
- Reliable 5G connectivity

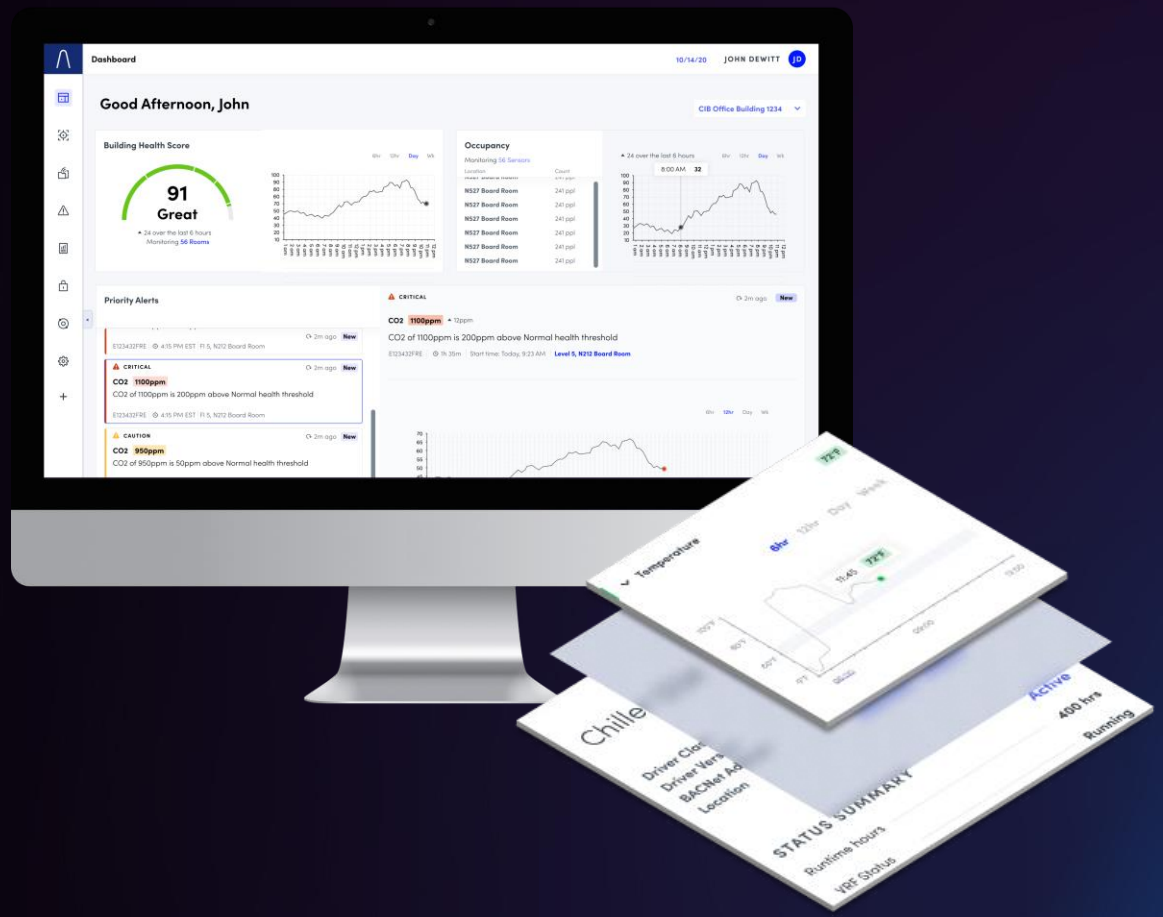
© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Abound is a platform for customer outcomes

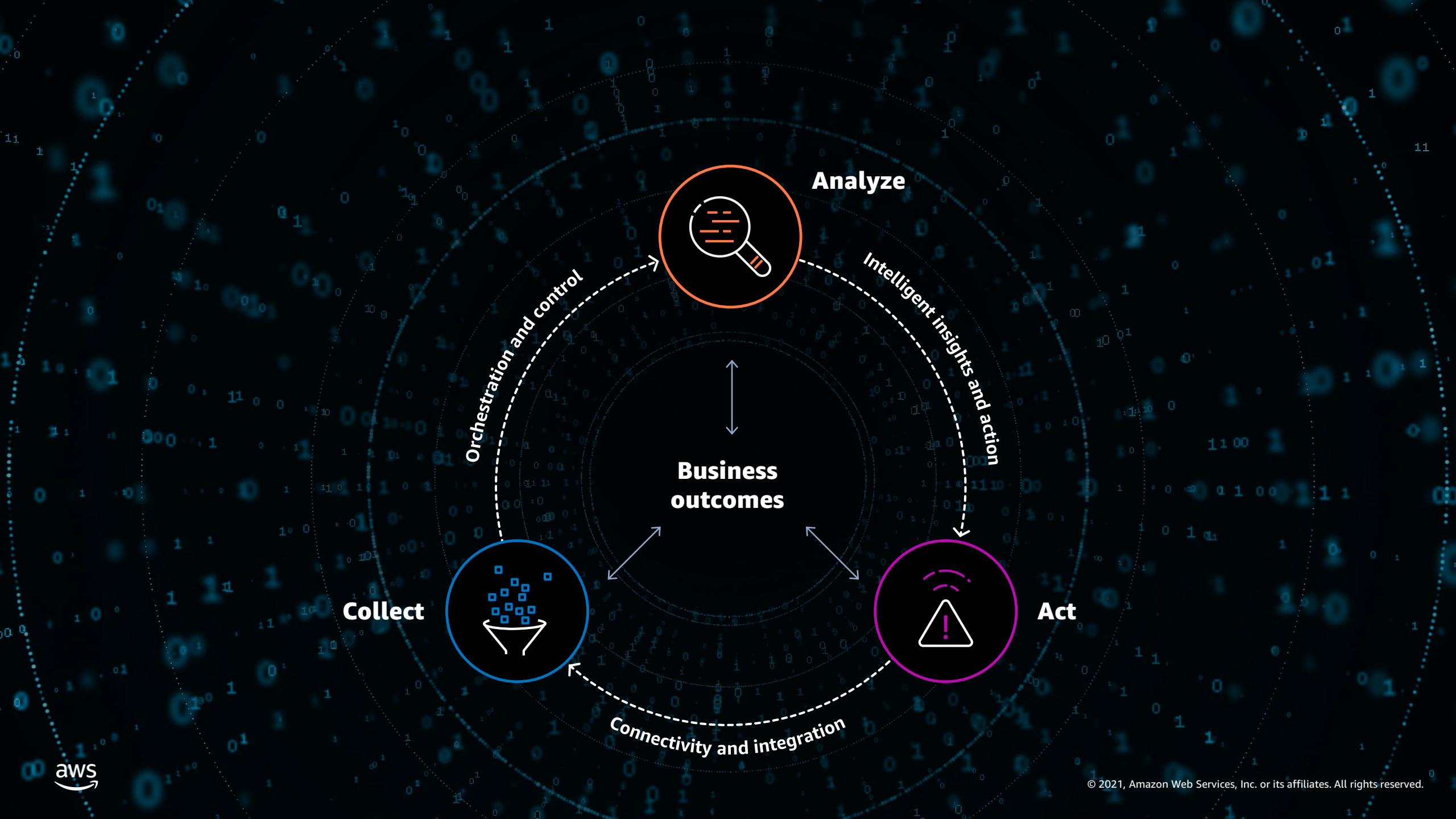
See data clearly

Respond to issues quickly

Optimize performance



© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.



© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

And we have great AWS Partners to help, too

Thousands
of AWS IoT Partners

>90%
of Fortune 100 use AWS Partners and solutions

>700 qualified AWS Partner devices in the **Partner Device Catalog**

>300 AWS and AWS Partner **IoT solutions**

AWS IOT PARTNER SOLUTIONS

Connected Factory
Asset Condition Monitoring
Connected Vehicle
and more

aws

© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Learn more in our AWS IoT re:Invent sessions

ID	SESSION TITLE	TYPE
IOT201	Predicting equipment health with IoT in power and utilities	Breakout
IOT202	Migrate and innovate faster with AWS IoT for connected products	Breakout
IOT204	Building connected auto solutions with AWS IoT	Breakout
IOT205	Industrial digital transformation using AWS IoT SiteWise	Breakout
IOT206	Scaling sustainability solutions with IoT	Breakout
IOT304	Increase factory efficiency via real-time decision support management	Chalk Talk
IOT311	AWS IoT device connectivity and provisioning	Chalk Talk
IOT313	Enhancing telecommunications CPE data collection & analytics with AWS	Breakout
IOT317	Building digital twins using AWS services	Chalk Talk

IOT218-L: AWS powers edge-to-cloud solutions

Leadership session with Bill Vass, VP of Engineering, AWS

(today at 2:30 p.m.)

aws

© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Visit us



AWS IoT Services

aws.amazon.com/iot/



AWS Partners

aws.amazon.com/iot/partner-solutions/



Ready-made solutions

aws.amazon.com/iot/solutions/

© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Thank you!

© 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved.