

The logo for AWS re:Invent features the words "AWS" and "re:Invent" stacked vertically. "AWS" is in a smaller, sans-serif font above "re:Invent", which is in a larger, bold, sans-serif font.

AWS
re:Invent

IOT218

IoT Leadership Session

Dirk Didascalou
VP AWS IoT

AWS
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If you knew the state of every **thing** and could reason on top of that data...

What **problems** would you solve?

AWS IoT customers solve problems in all sectors

VIZIO



Fender®

PHILIPS

YANMAR

Amway



Trimble™



Panasonic



Valmet

hudl

VANTAGE
POWER

iRobot®

rotimatic

enel

WÄRTSILÄ

RAILPOD
comprehensive track data for safer railroads

VESTEL

DB

embraco

StanleyBlack&Decker

Haier

Symantec™

modjoul

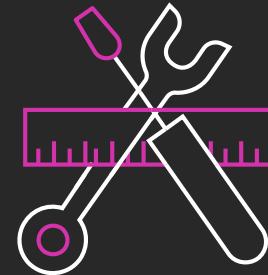
GP PRO
Georgia-Pacific

BrainCo
your brain controls everything

ThermoFisher
SCIENTIFIC

ANALOG
DEVICES

What customers are doing with AWS IoT



Predictive maintenance



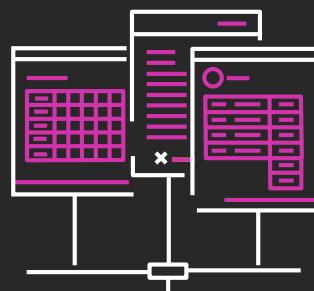
Wellness and health solutions



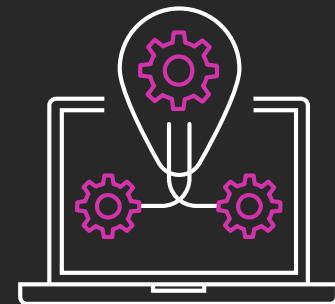
Productivity and process optimization



Connected buildings and city systems



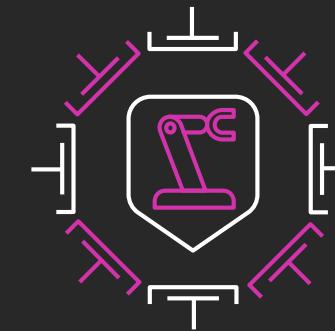
Device fleet maintenance



Energy efficiency monitoring



Payment, insurance and connected commerce



Safeguard manufacturing facilities

Business outcomes with IoT



Revenue growth
IoT data drives business growth

Operational efficiency
IoT data decreases OpEx

What are the fundamentals of AWS IoT?

AWS IoT architecture



Data
services

How can I extract value from my IoT data?



Control
services

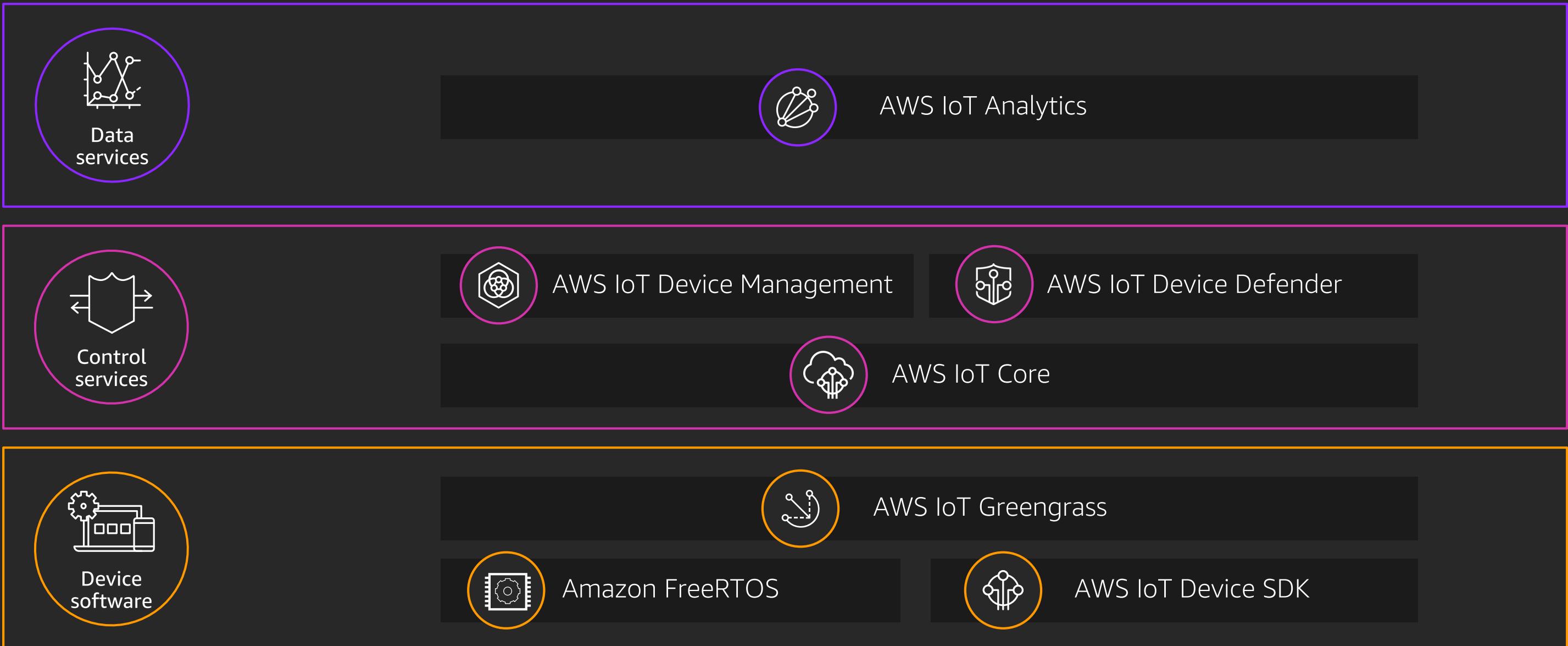
How can I control, manage, and secure my devices?



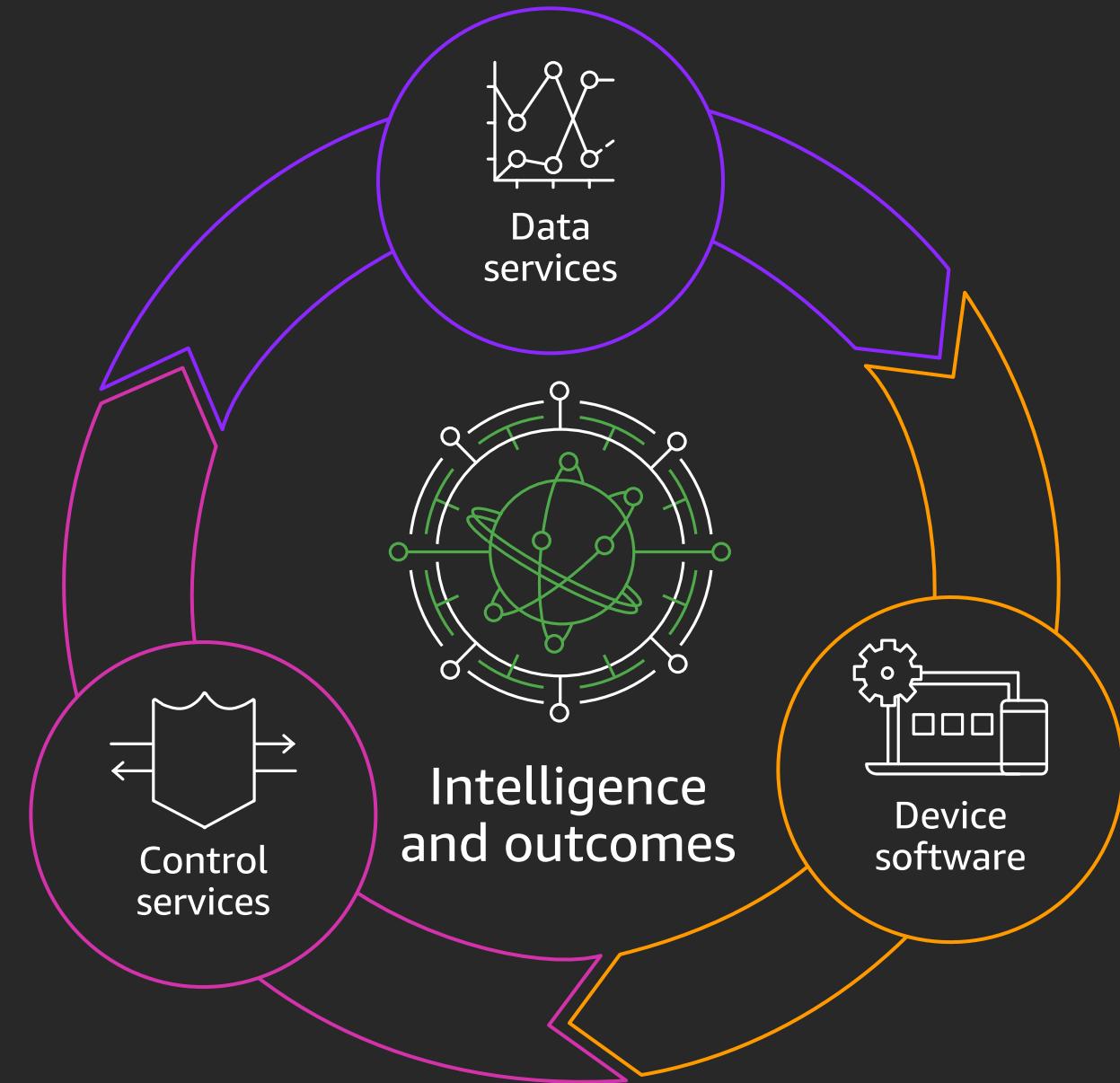
Device
software

How can I connect my devices and operate at the edge?

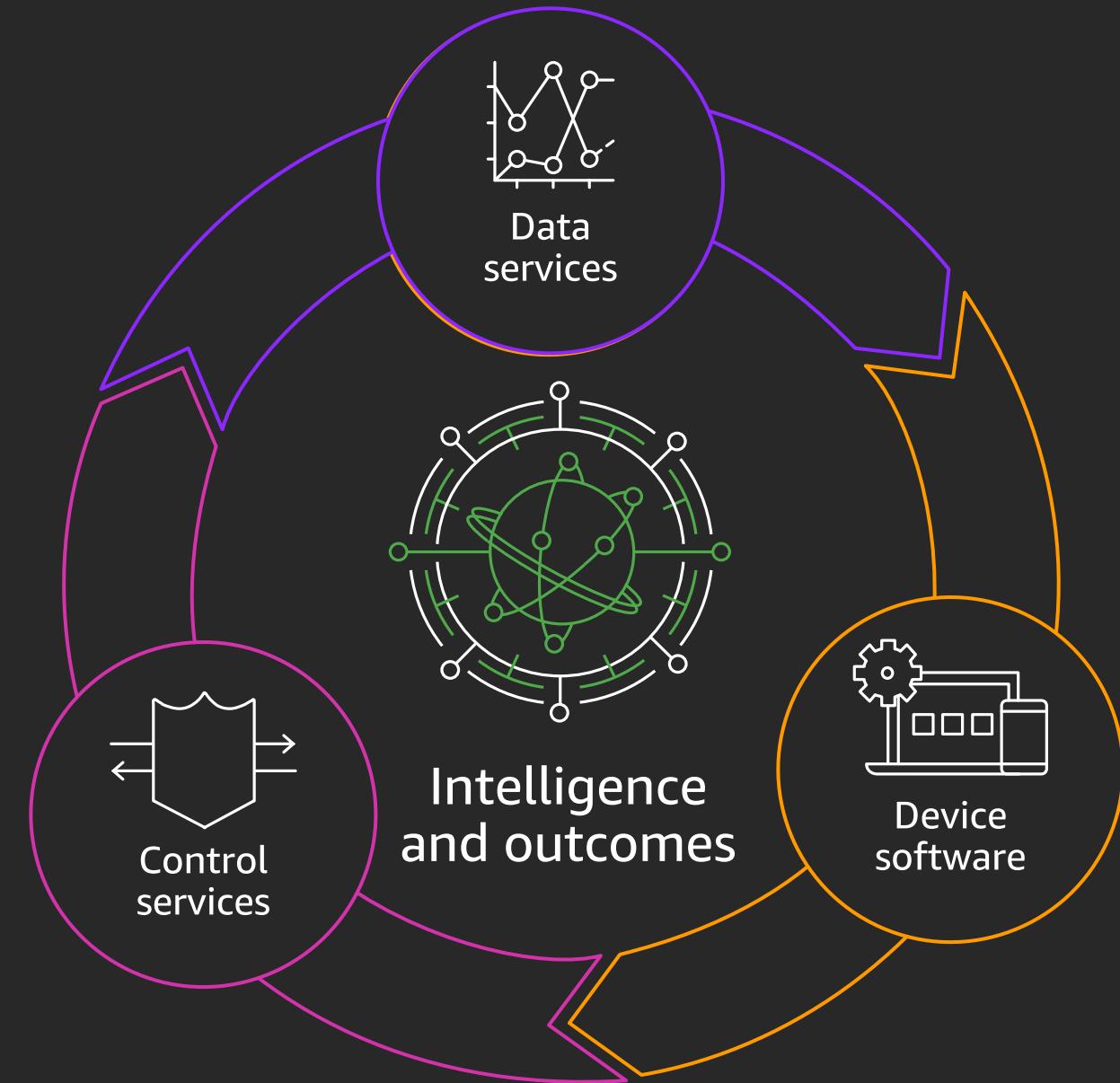
AWS IoT architecture



IoT virtuous cycle



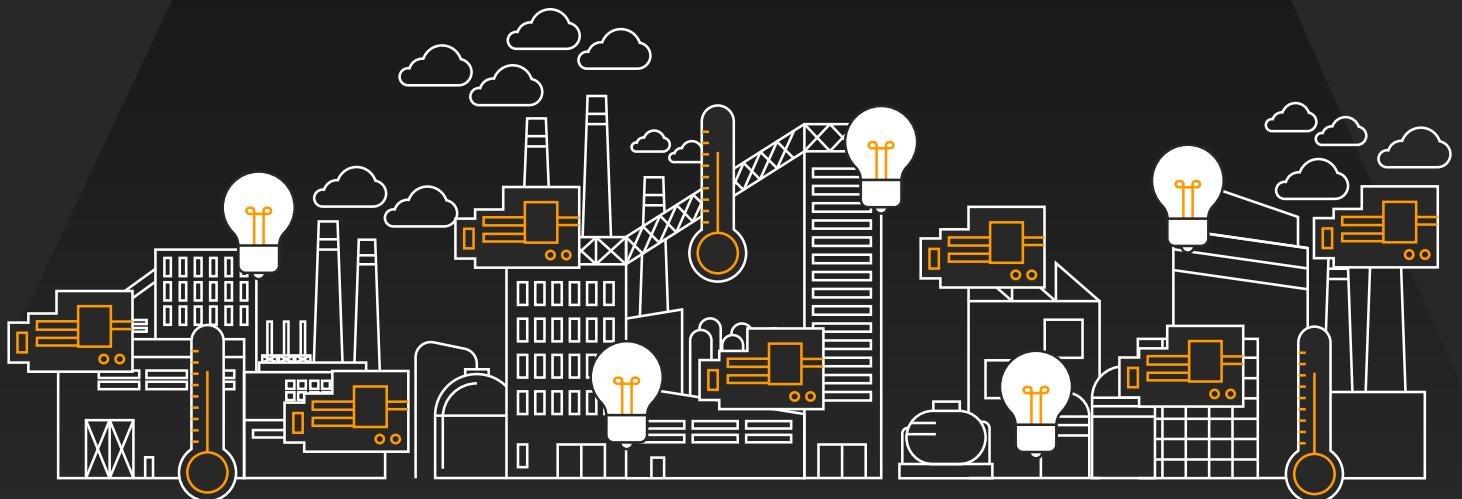
IoT virtuous cycle



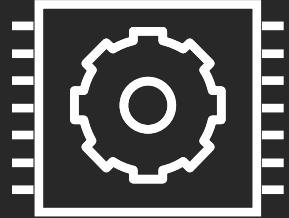
How can I securely connect constrained microcontroller-based devices?



Device
software



Amazon FreeRTOS



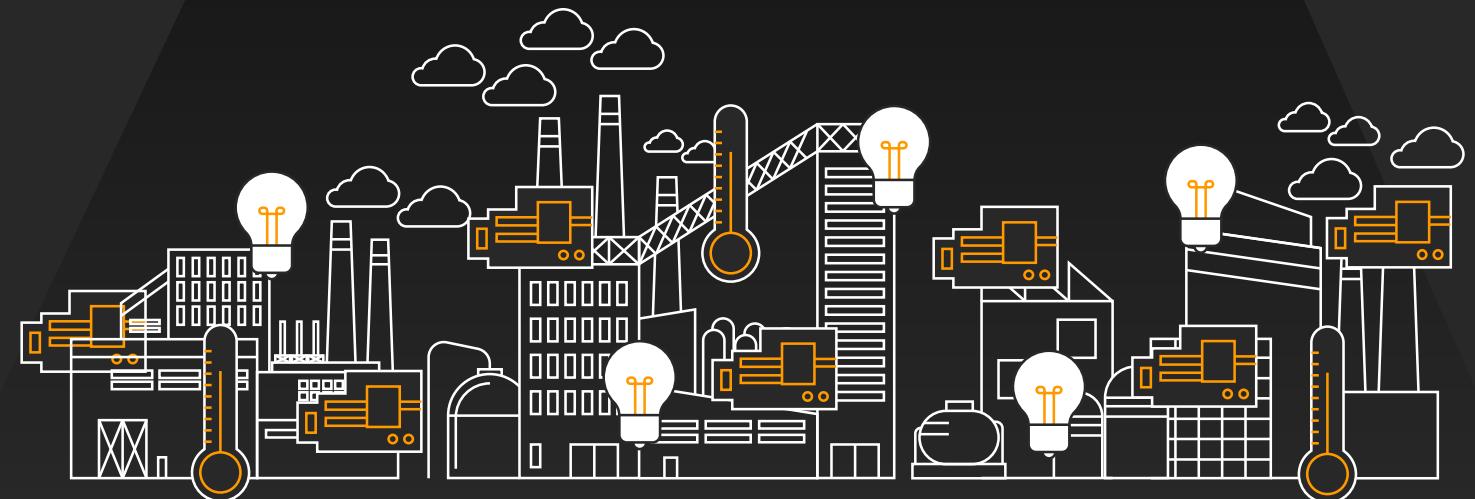
IoT operating system for microcontrollers



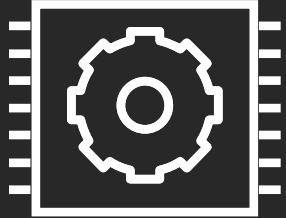
Device
software



?



Amazon FreeRTOS



IoT operating system for microcontrollers

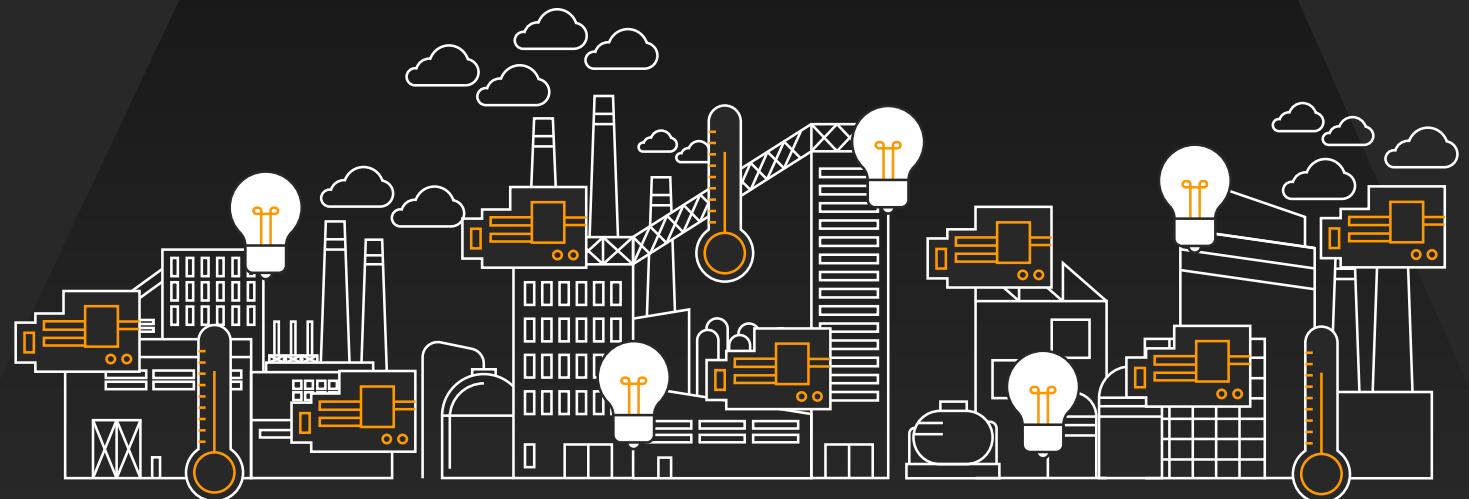
Local connectivity libraries (WiFi & Ethernet),
cloud connectivity and security libraries,
over-the-air updates with code signing



Device
software

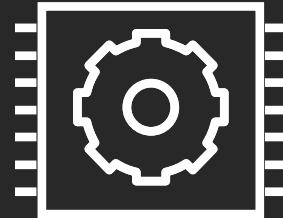


?



New Feature!

Amazon FreeRTOS

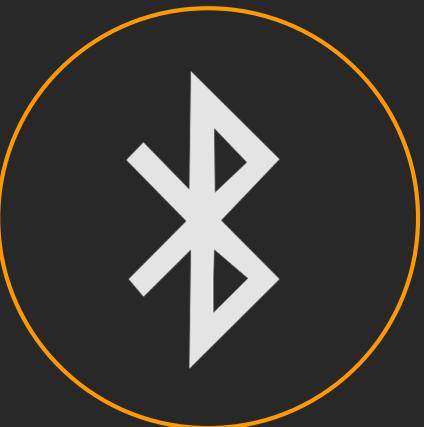


IoT operating system for microcontrollers

**Local connectivity libraries (WiFi & Ethernet),
cloud connectivity and security libraries,
over-the-air updates with code signing**

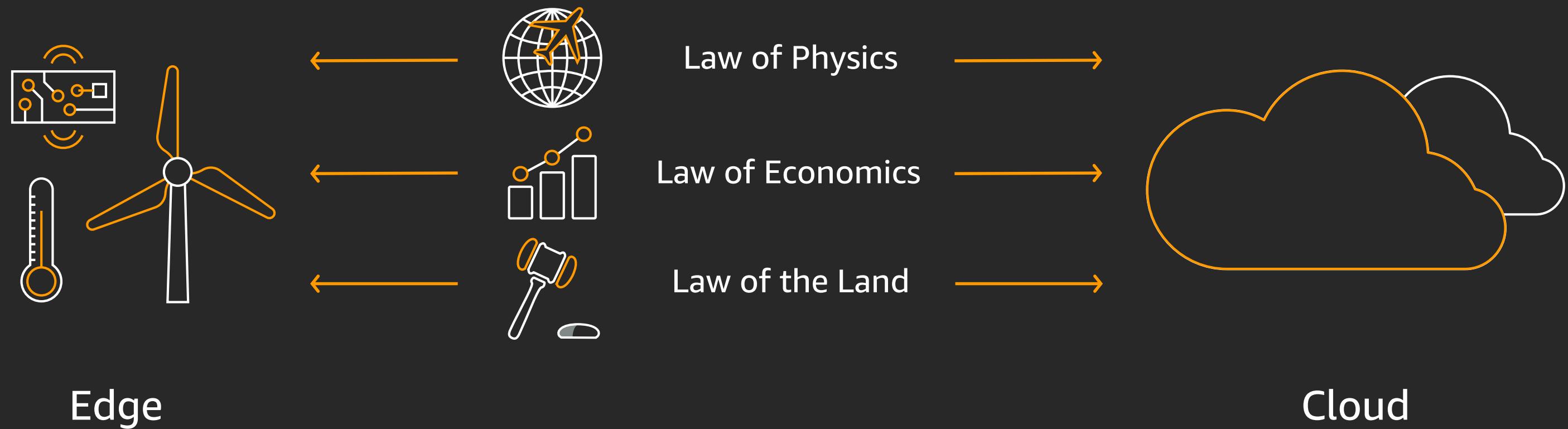


Device
software



Bluetooth Low Energy
Now with BLE connectivity

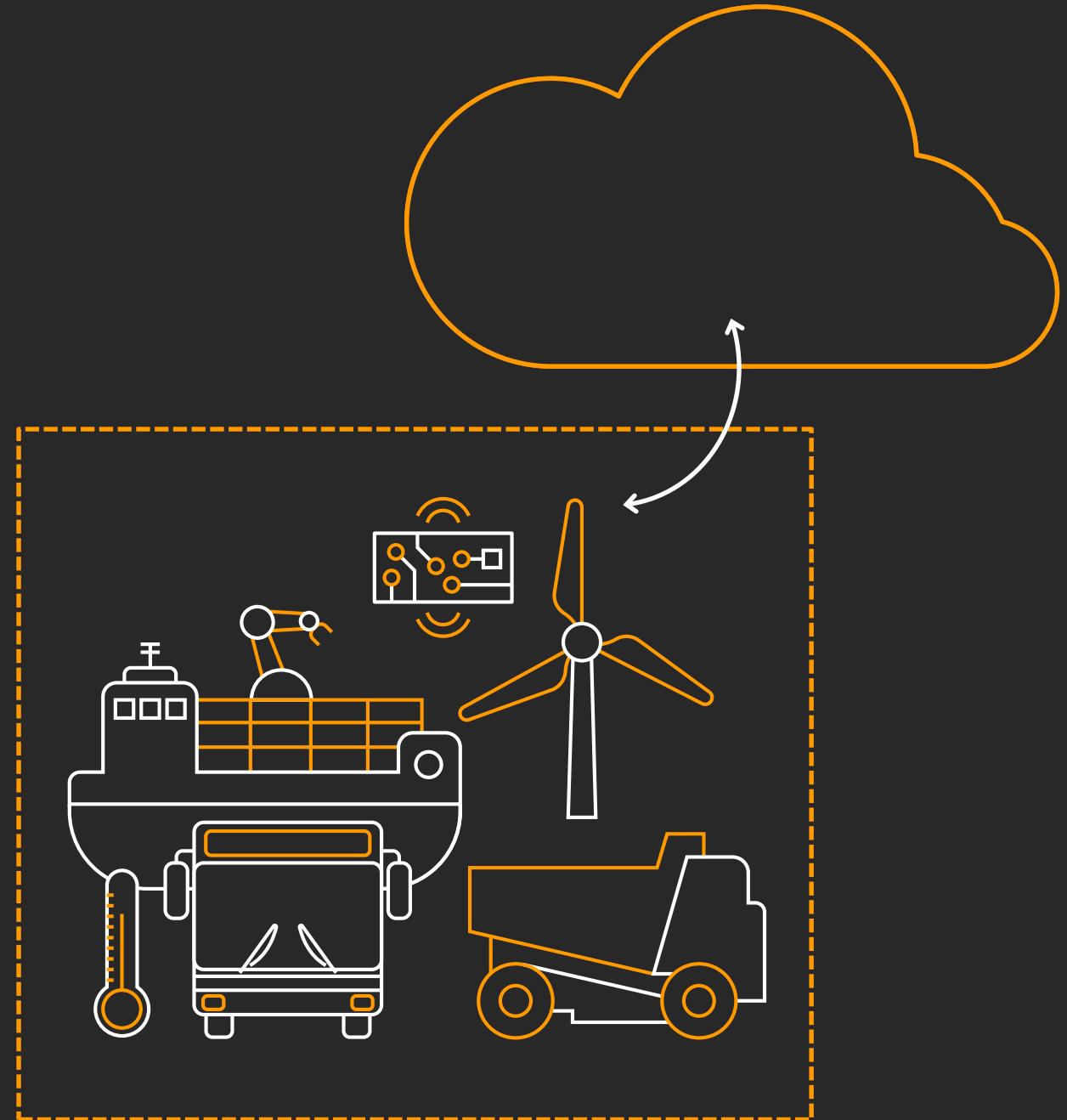
Three laws



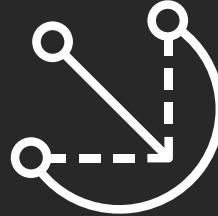
How can I extend AWS IoT Cloud capabilities to the edge?



Device
software



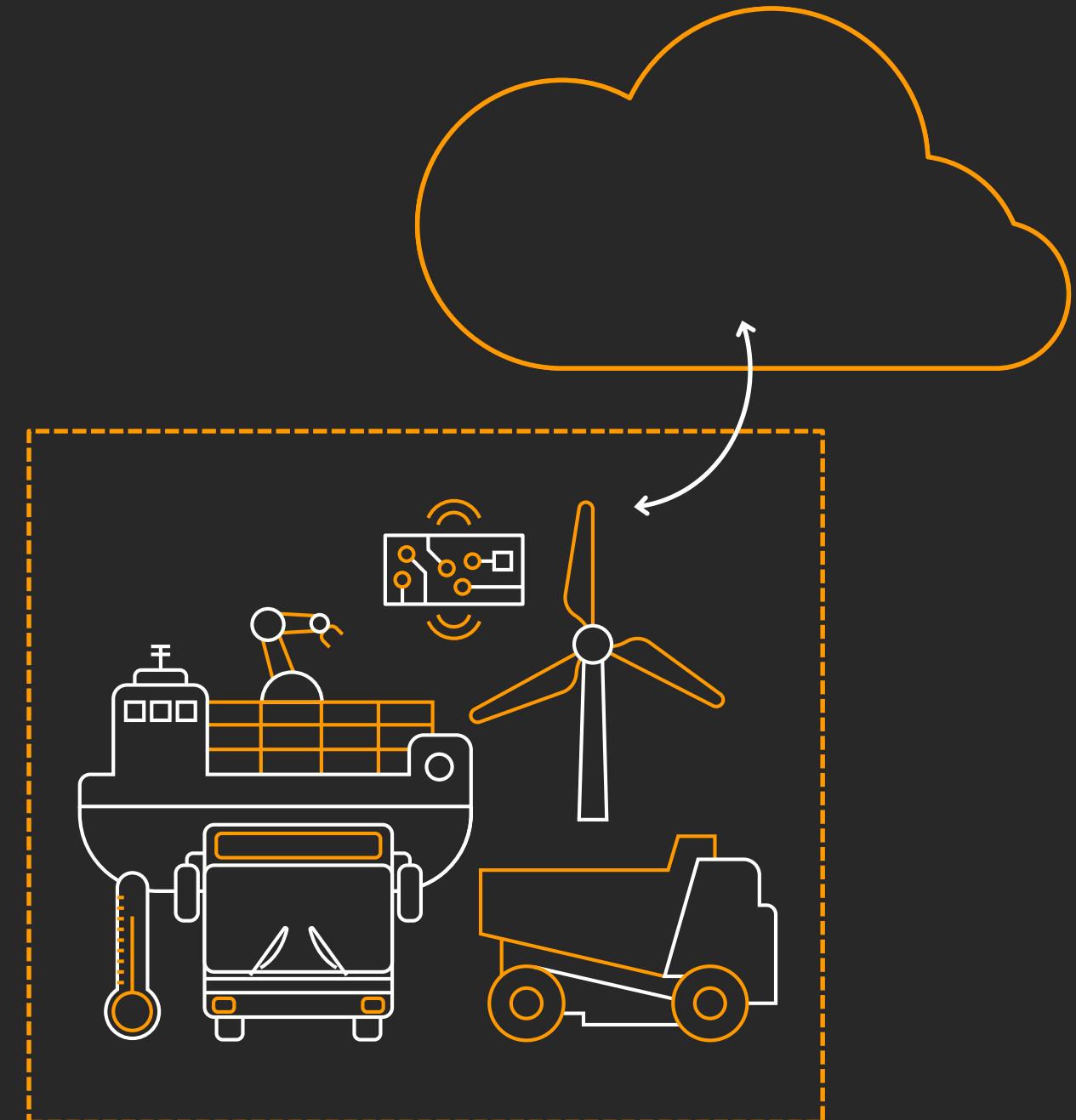
AWS IoT Greengrass



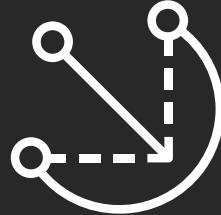
Extend AWS IoT to the edge



Device
software



AWS IoT Greengrass

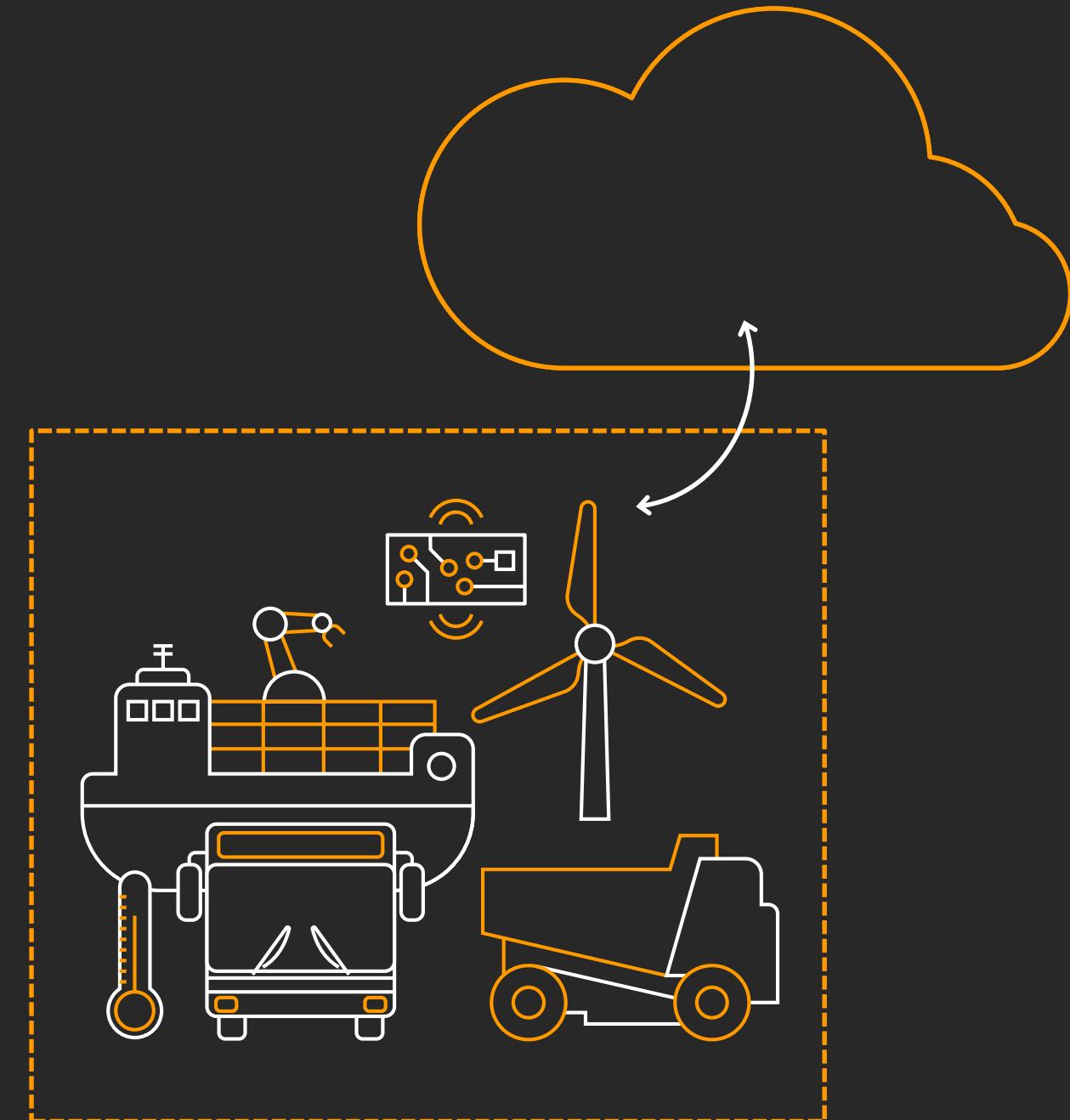


Extend AWS IoT to the edge

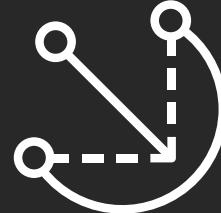
Local messages and triggers, local actions, data and state sync, security, local resource access, over-the-air updates, machine learning inference



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AWS IoT Greengrass



Extend AWS IoT to the edge

Local messages and triggers, local actions, data and state sync, security, local resource access, over-the-air updates, machine learning inference



Device software



Connectors

Pre-built integrations with third-party services, on premises software, and AWS services



Secrets Manager

Securely store, access, rotate and manage secrets at the edge

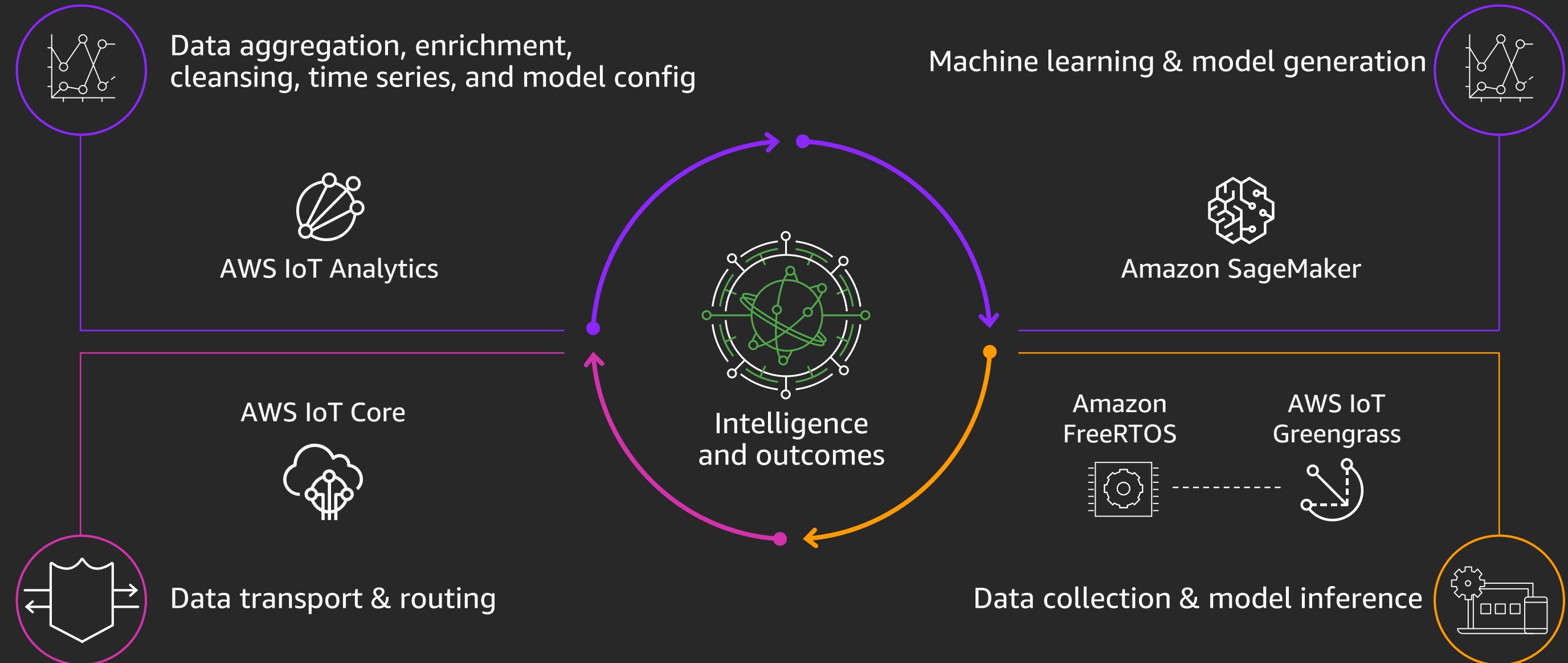


Hardware Security Integration

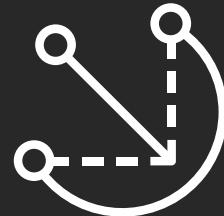
Store private device keys on a hardware secure element

"AloT" (AI and IoT) — ML at Edge trend

ML: Train in the cloud, infer at the edge



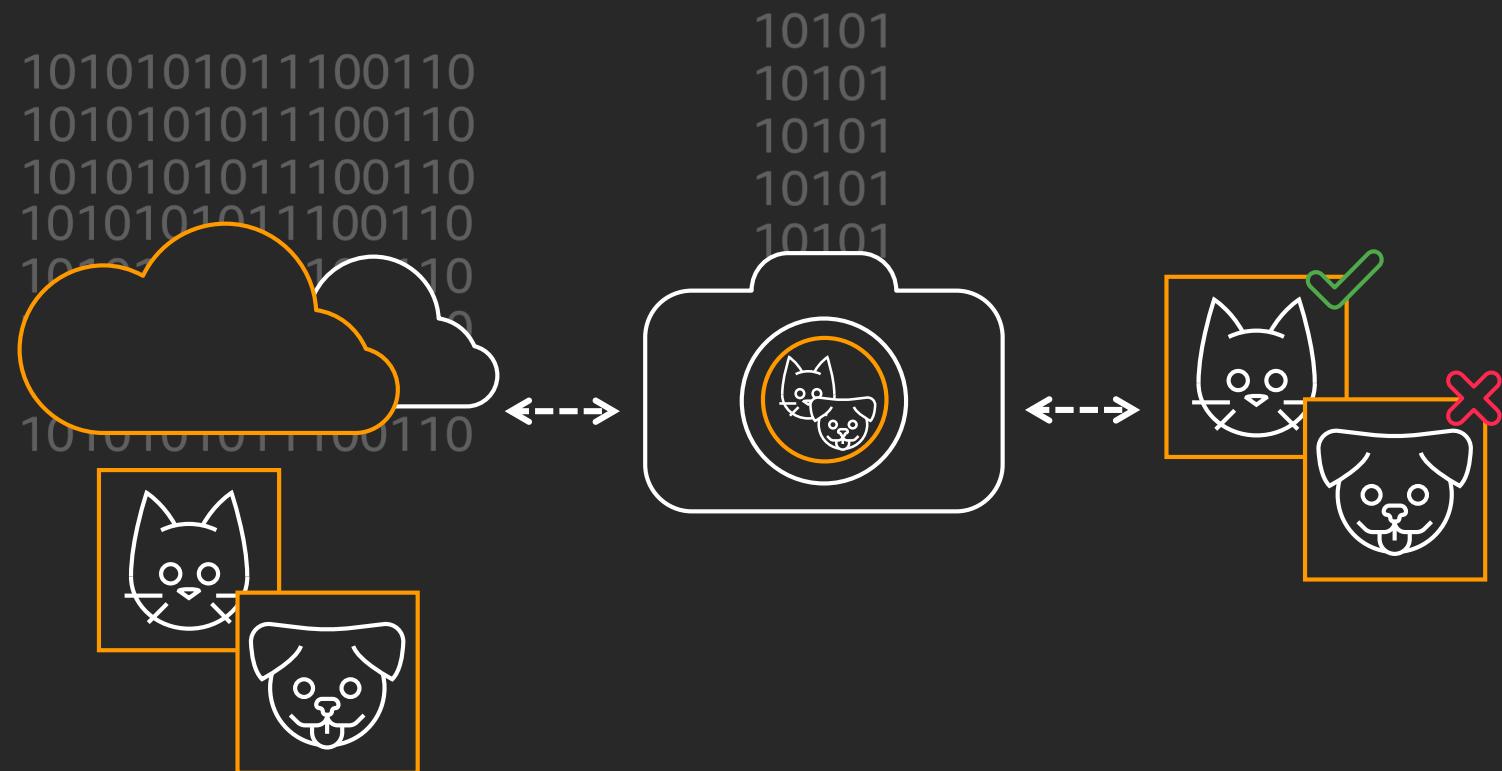
AWS IoT Greengrass



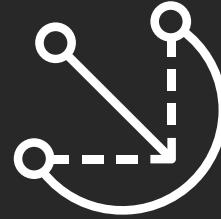
Machine learning inference: Train in the cloud, run models at the edge



Device software



AWS IoT Greengrass



Machine learning inference:
Train in the cloud,
run models at the edge



Device
software



Build more
accurate models

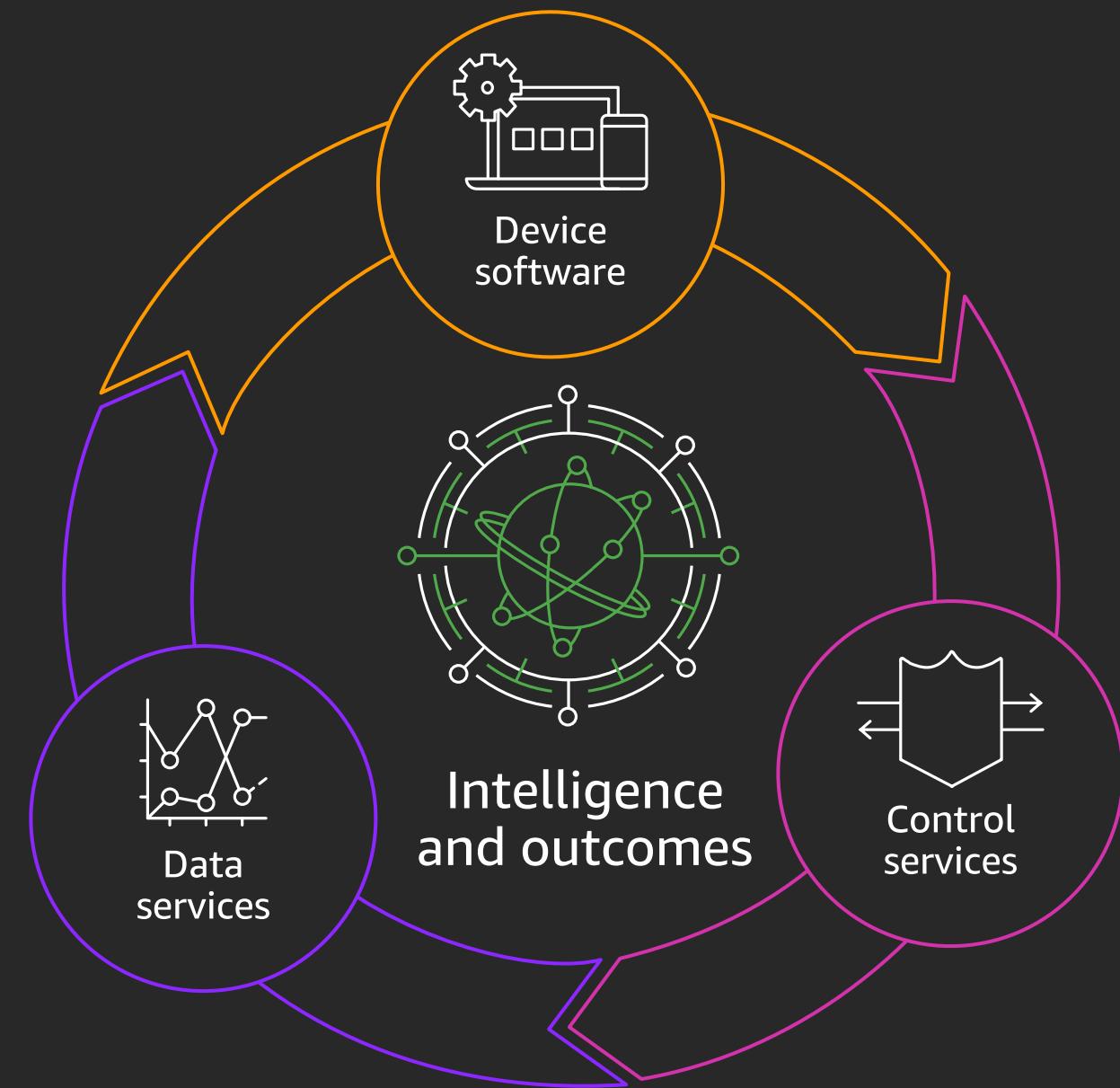


Reduce the model's
runtime footprint by 100x



Run inference
2x faster

IoT virtuous cycle



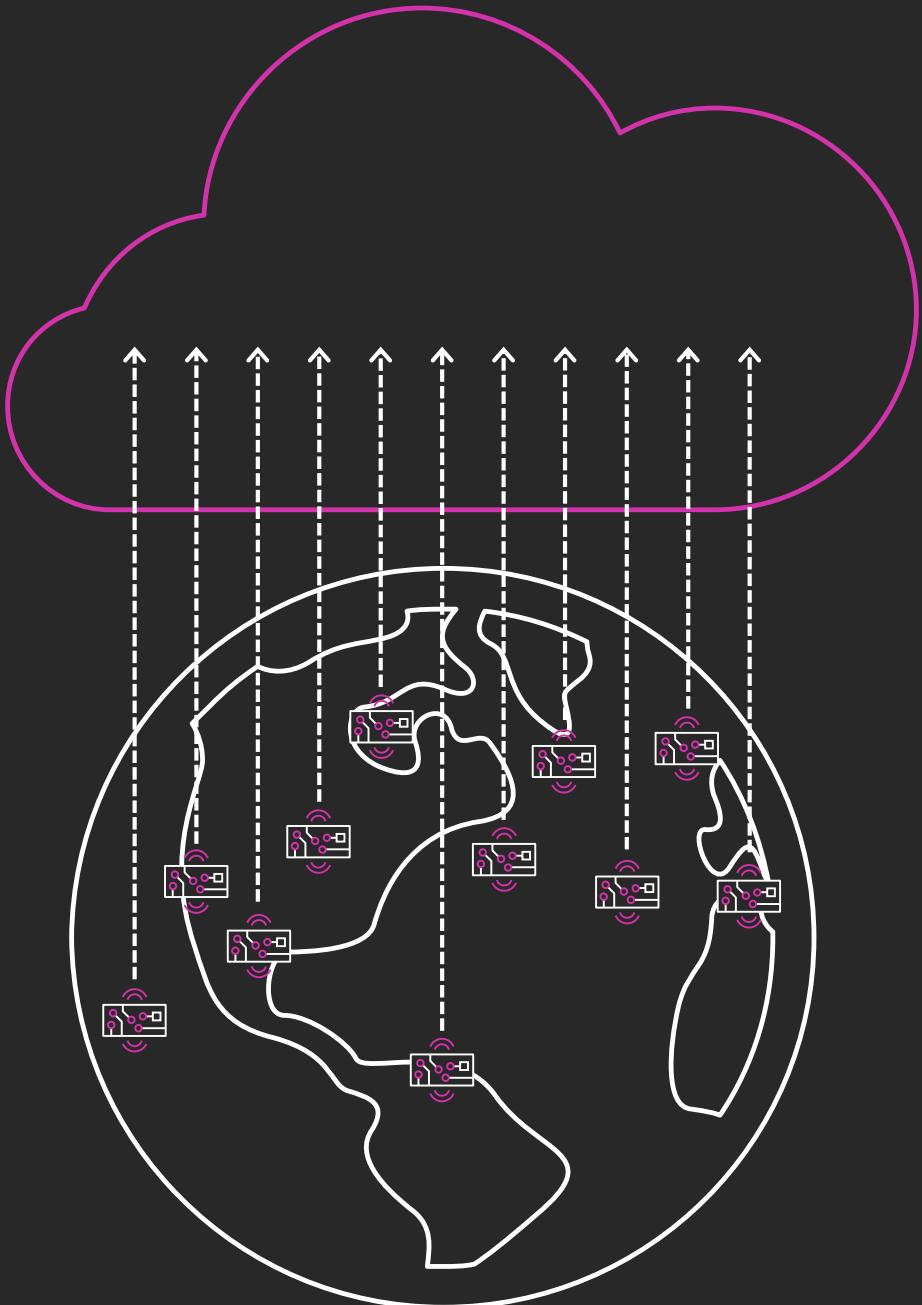
How can I connect my devices securely, and handle the data they generate at scale?



Control services

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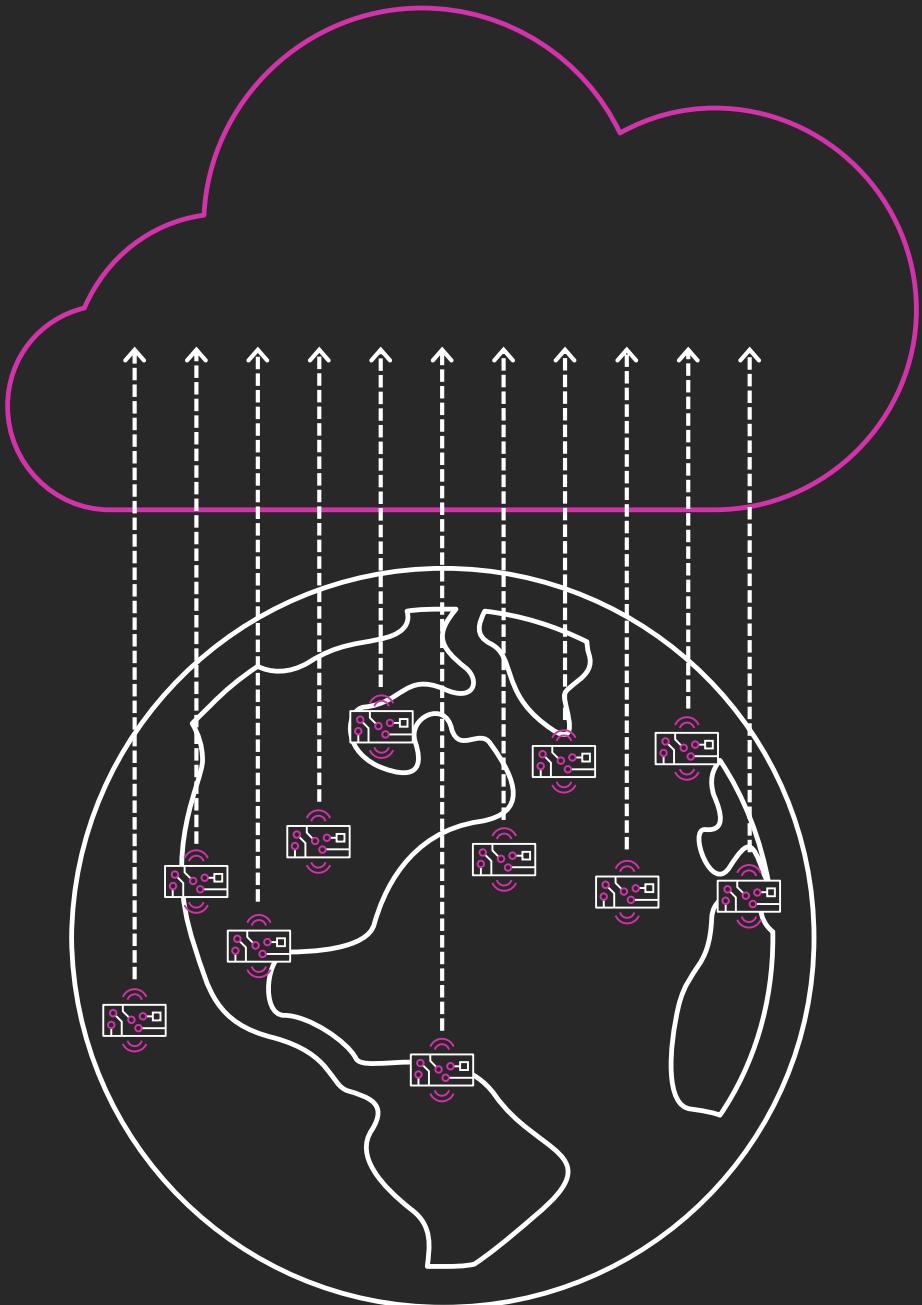
AWS IoT Core



Secure device connectivity and messaging
at scale



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AWS IoT Core

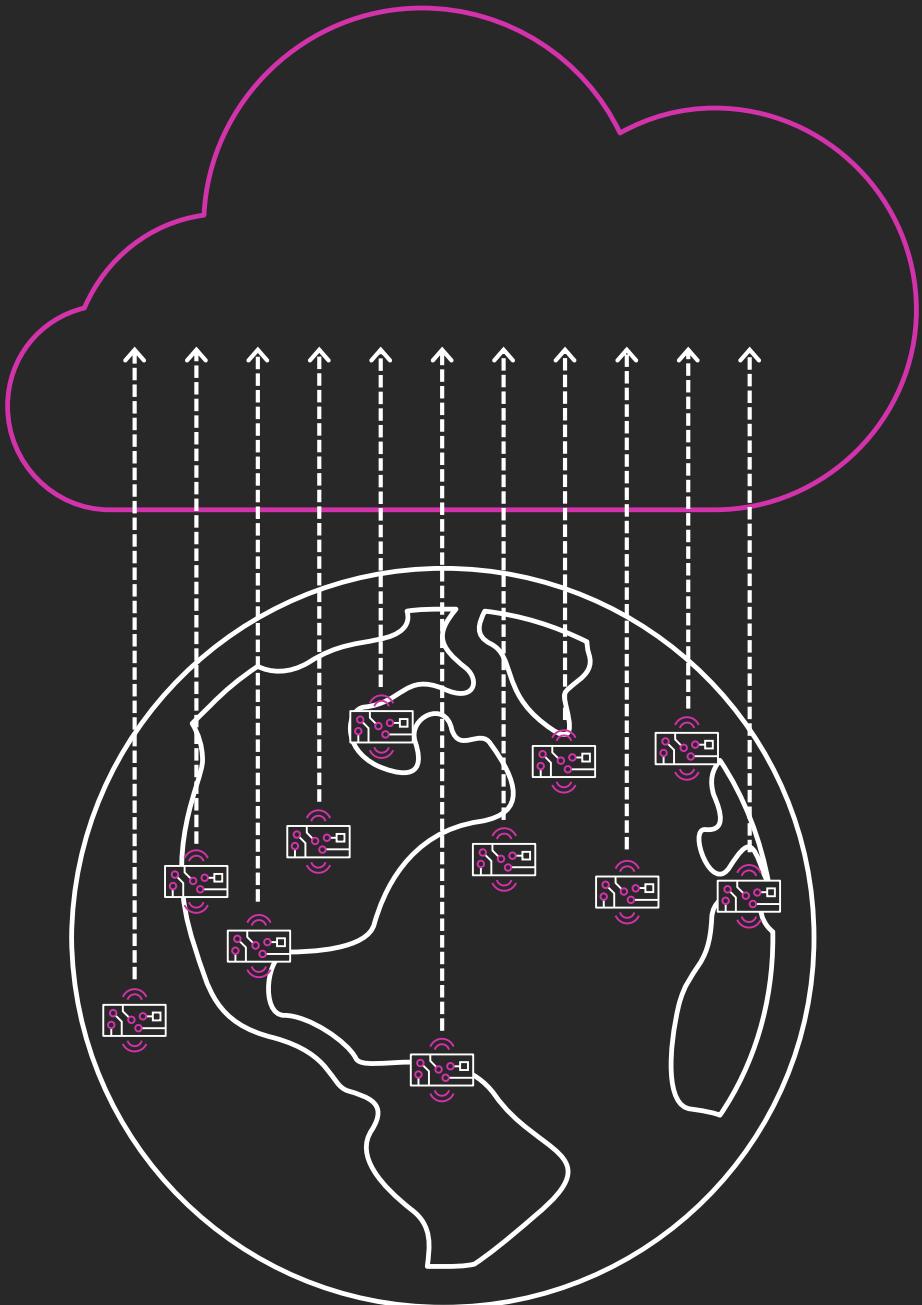


Secure device connectivity and messaging
at scale

Identity service, device gateway, message
broker, rules engine, device shadow, registry



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New Feature!

AWS IoT Core

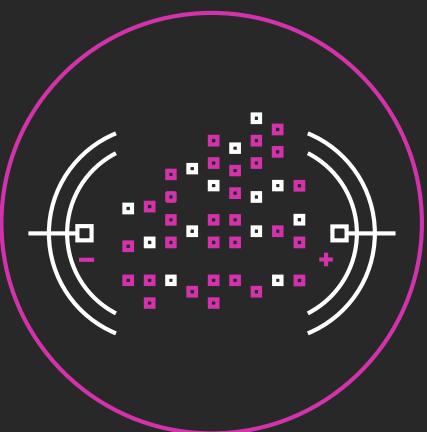


Secure device connectivity and messaging
at scale

Identity service, device gateway, message
broker, rules engine, device shadow, registry



Control
services



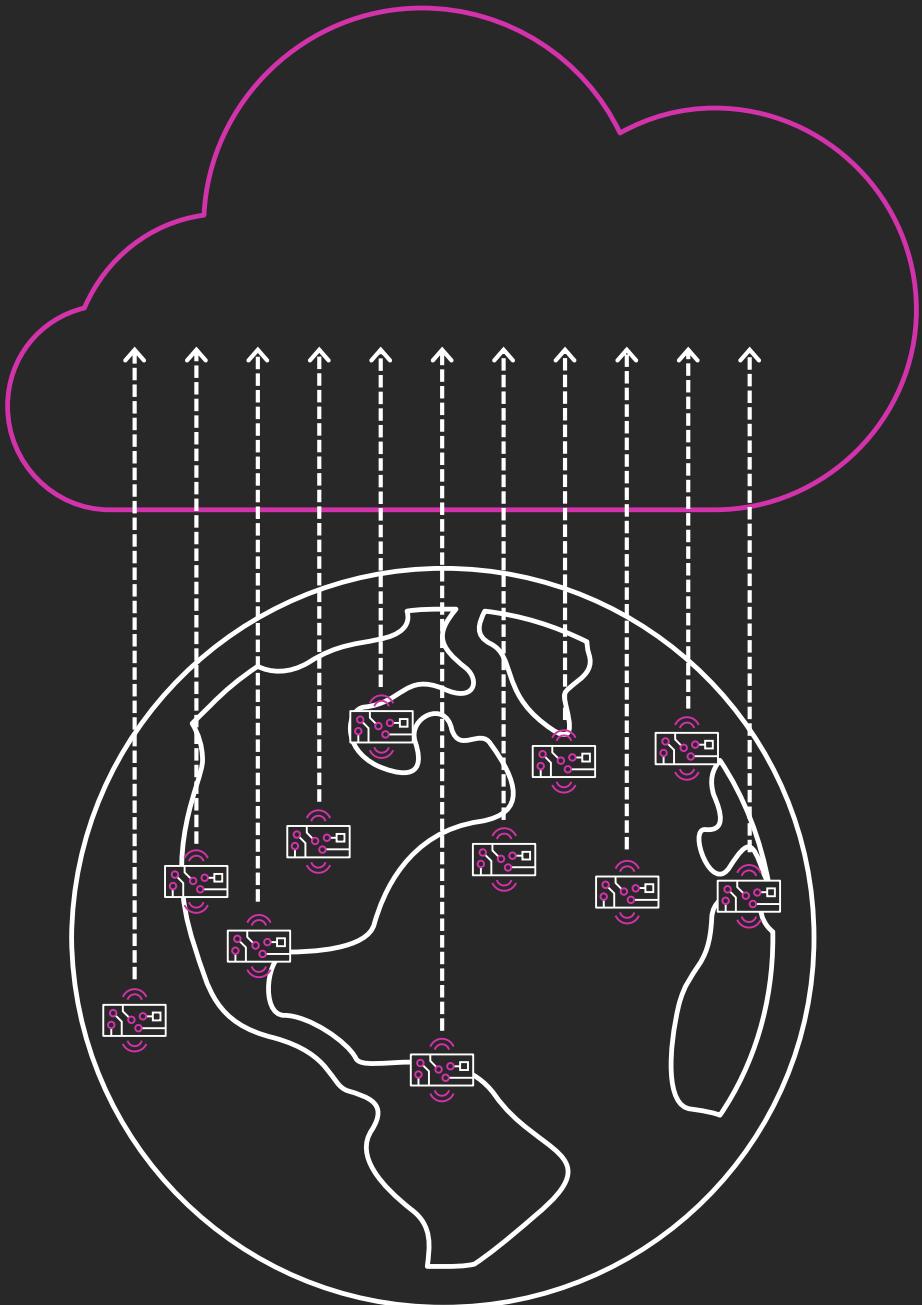
Basic Ingest

Improves the ability to ingest
large amounts of device data at a
lower cost

How can I manage my growing number of connected devices?



Control services



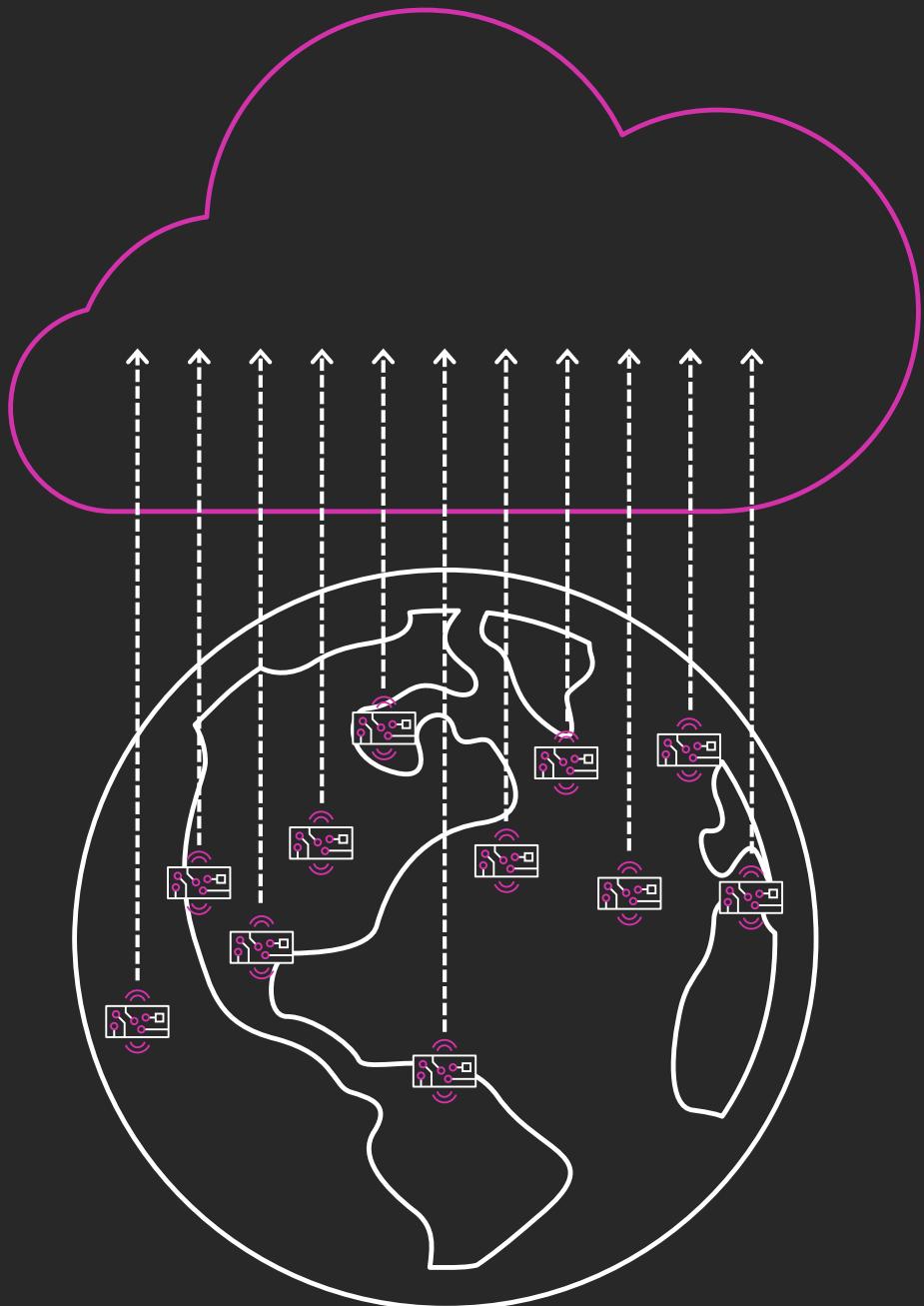
AWS IoT Device Management



Maintain fleet health at scale



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AWS IoT Device Management

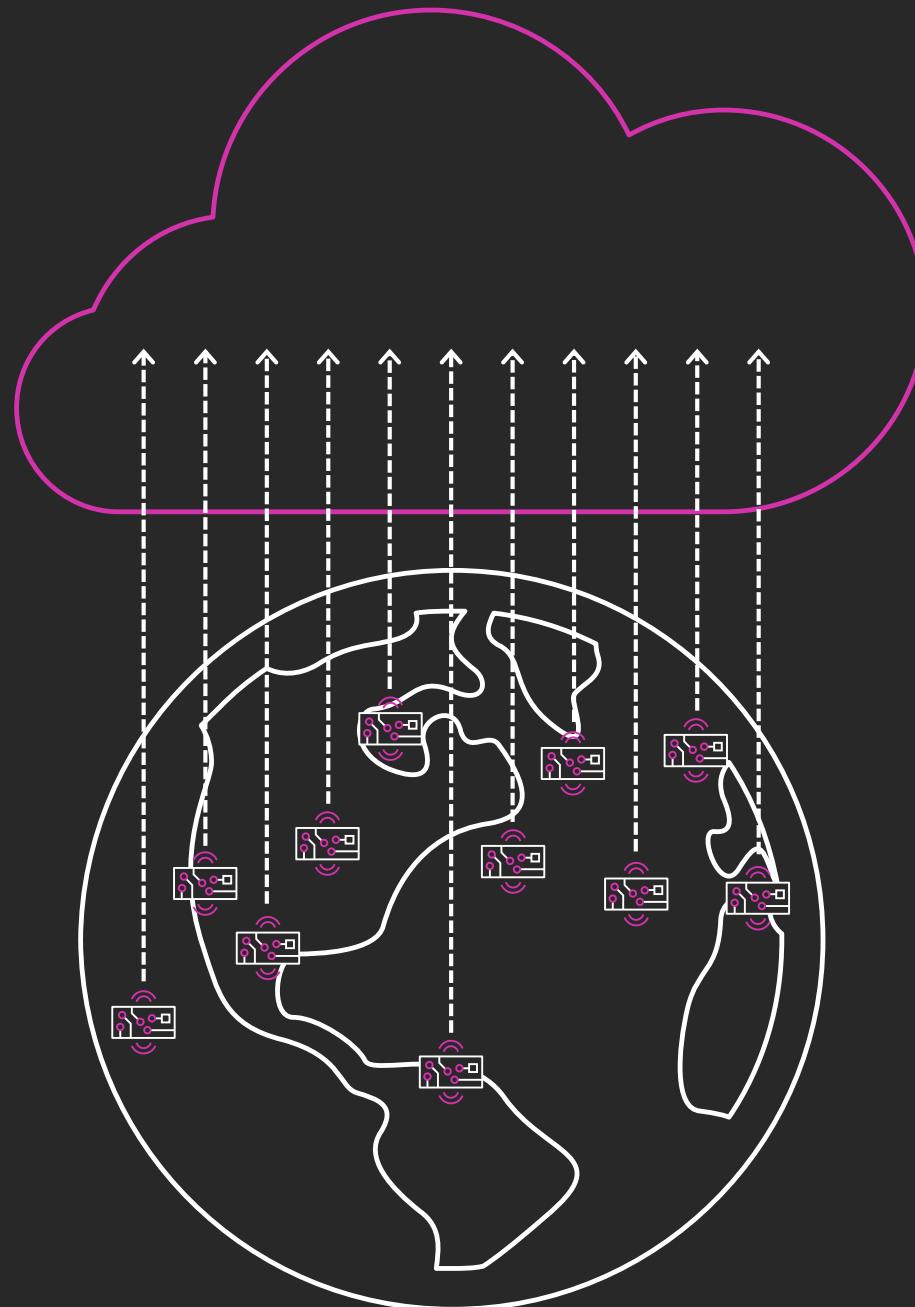


Maintain fleet health at scale

Batch fleet provisioning, real-time fleet index & search, fine grained device logging & monitoring, over-the-air updates



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AWS IoT Device Management



Maintain fleet health at scale

Batch fleet provisioning, real-time fleet index & search, fine grained device logging & monitoring, over-the-air updates



Control services



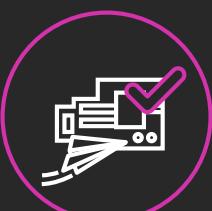
Device Connectivity Indexing
Index your devices' lifecycle events



Dynamic Thing Groups
Automate the hierarchical grouping of your devices



Dynamic Jobs
Stage your OTA fleet rollouts

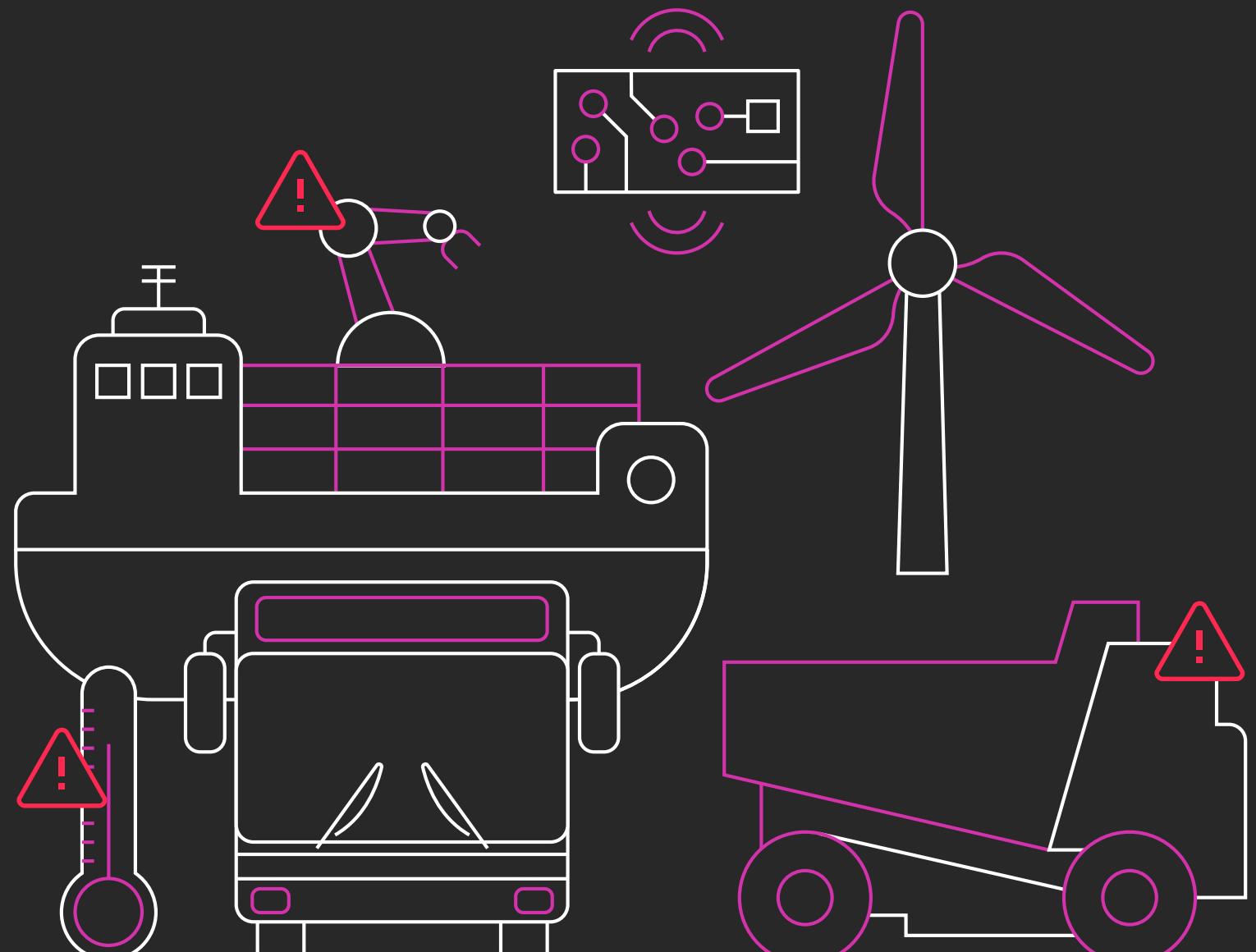


Code Signing
Digitally sign code before execution

How do I ensure my connected devices at fleets stay secure?



Control services



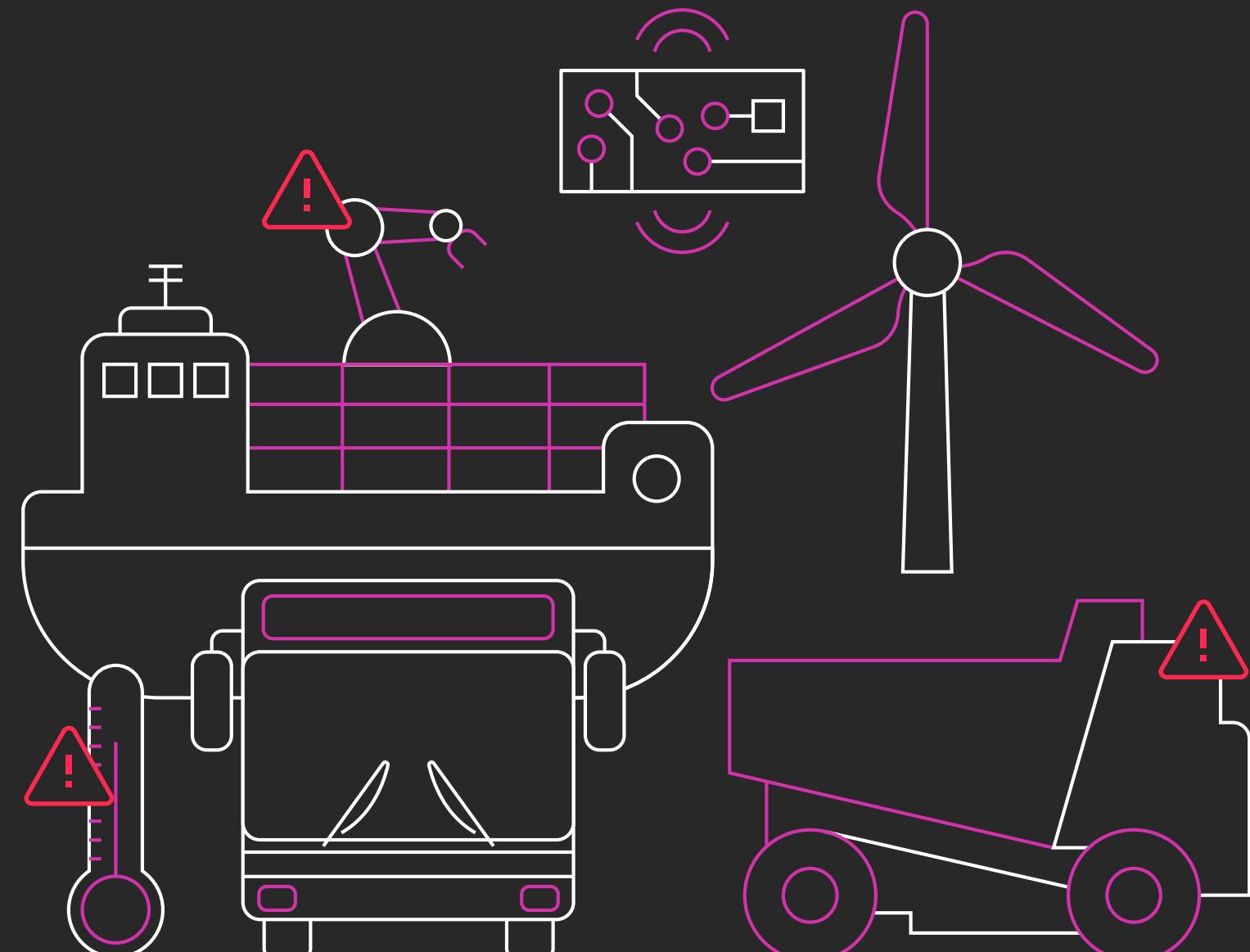
AWS IoT Device Defender



Keep your fleet secure at scale



Control
services

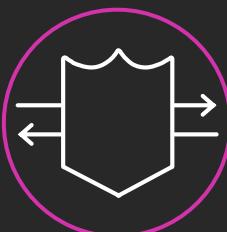


AWS IoT Device Defender

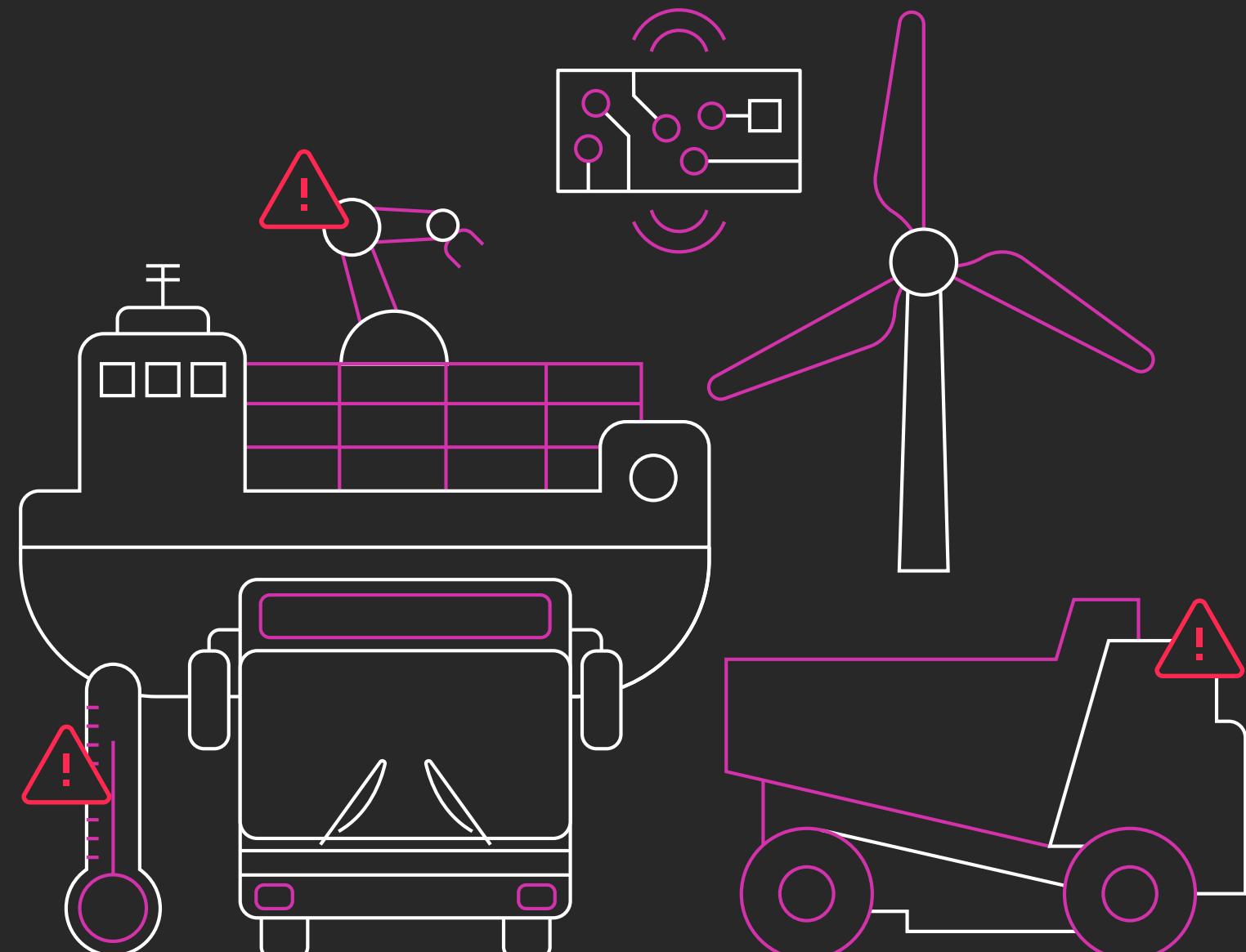


Keep your fleet secure at scale

Audit device configurations, monitor device behavior, identify anomalies, generate alerts, investigate and mitigate security issues



Control services



VIZIO



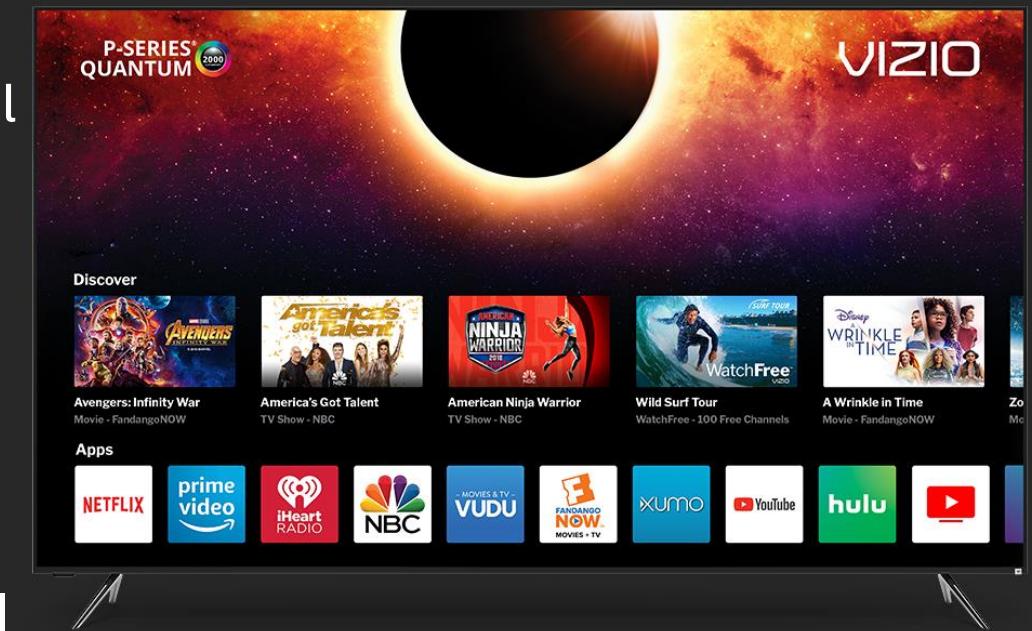
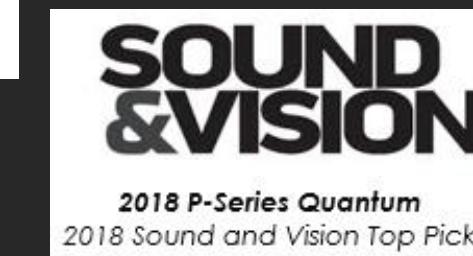
VIZIO is the **#1 American-based Smart TV Brand in America** ⁽¹⁾

- ✓ Our mission is to deliver cutting edge technologies to everyday customers.



SmartCast OS is our latest Smart TV & Audio OS

- ✓ Content centric Smart TV UX with voice, mobile & remote control
- ✓ SmartCast TV is **#1 in Alexa Compatible Voice Control** ⁽²⁾



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⁽¹⁾ The NPD Group, Inc. / Weekly Retail Tracking Service, based on LCD TV dollars and units sold with Apps Included in the U.S. from Jan. 5, 2014 – January 20, 2018

⁽²⁾ The NPD Group, Inc. / Weekly Retail Tracking Service, based on units sold through the period ending October 6, 2018

Problem Statement

Deploy robust, scalable, cost-effective infrastructure to power smart TV & speaker functionality.

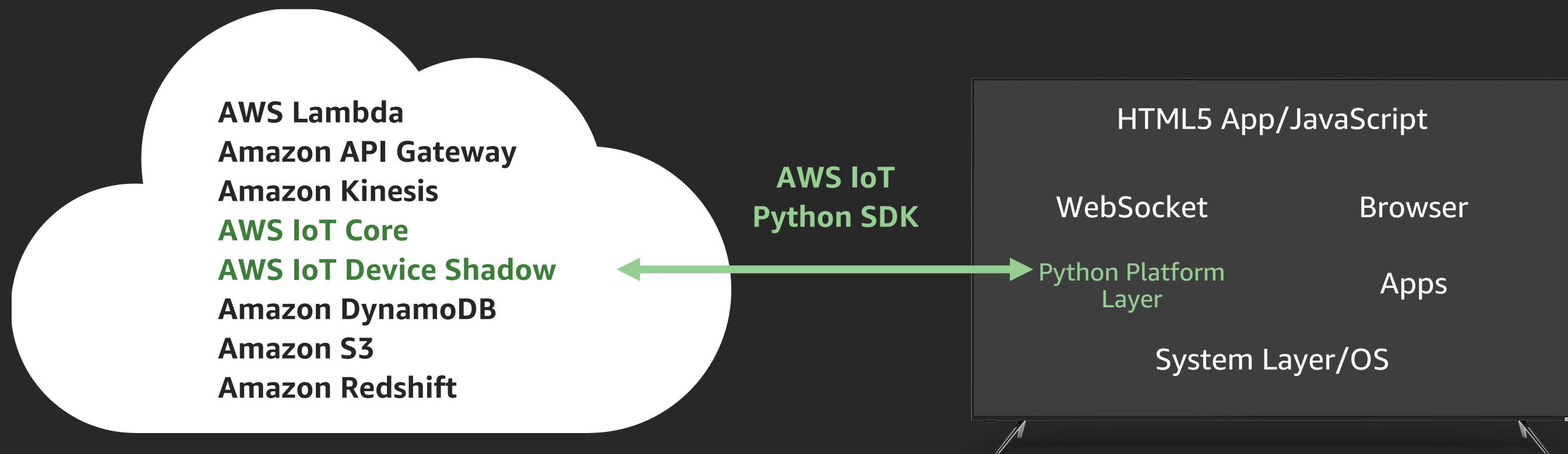
- **Secure, highly scalable, low cost cloud infrastructure**
- **High availability, low latency cloud device control & telemetry**
- **Small embedded device footprint**
- **Interfaces for popular development frameworks**
- **Roadmap of complementary services**

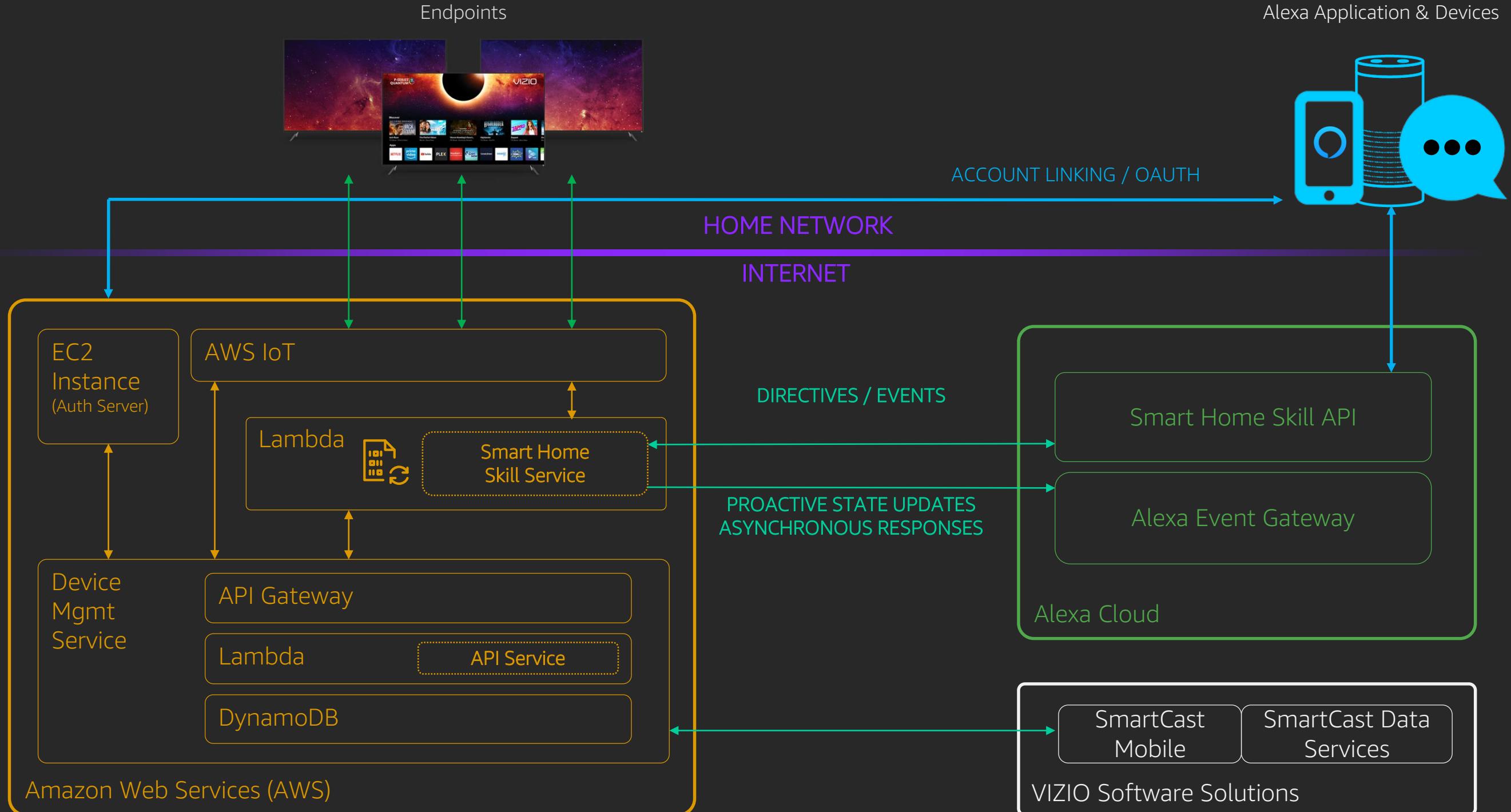


AWS IoT was the logical choice

- ✓ Secure, highly scalable, low cost cloud infrastructure
- ✓ High availability, low latency cloud device control & telemetry
- ✓ Amazon Consulting provided hands-on support for initial bootstrap

VIZIO's AWS IoT-based Solution





The AWS IoT Advantages for VIZIO



Happy customers

- ✓ We delivered Alexa Voice capabilities to all fielded and new SmartCast TVs in short order



Worry Free Infrastructure

- ✓ Amazon AWS scale & reliability ensures high availability giving our teams peace of mind



Real-time Insights

- ✓ We combined AWS IoT with Amazon Analytics to unlock real-time insights



Cost Reduction

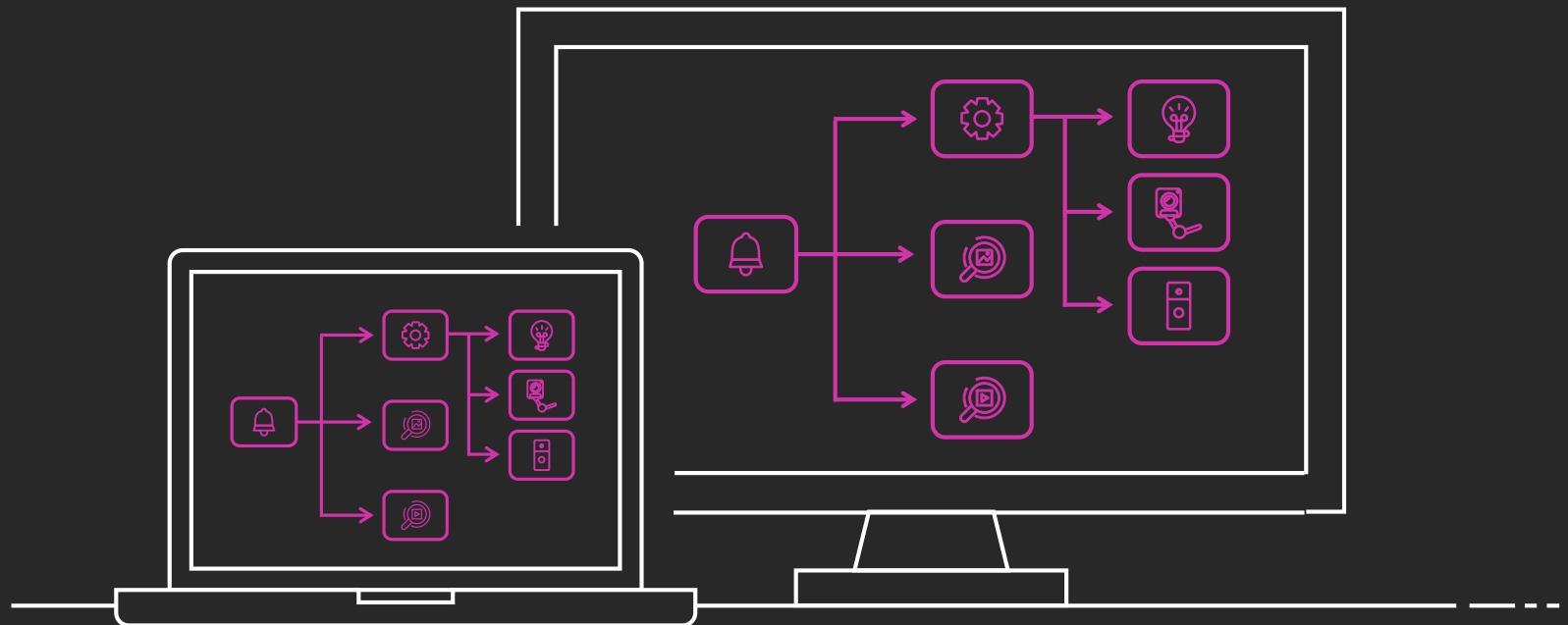
- ✓ Infrastructure enables integration with customer service call center to reduce call times



Best Is Yet To Come

- ✓ Versatile infrastructure means we'll be able to quickly add new applications

How can I build IoT applications faster?



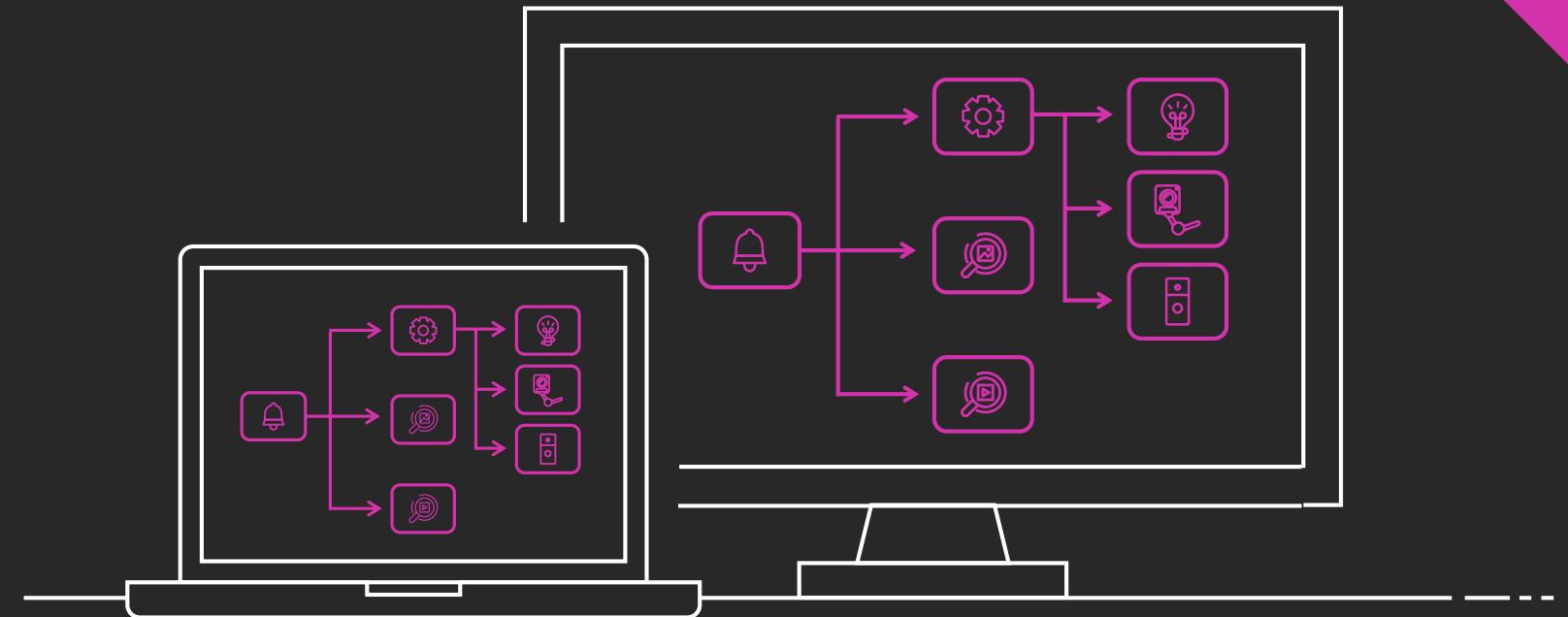
Control
services

New Service!
Preview

AWS IoT Things Graph



Connect devices and web services with little to no code



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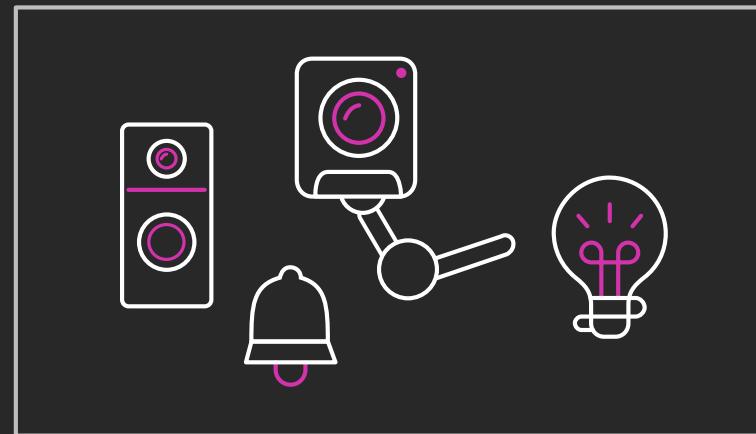
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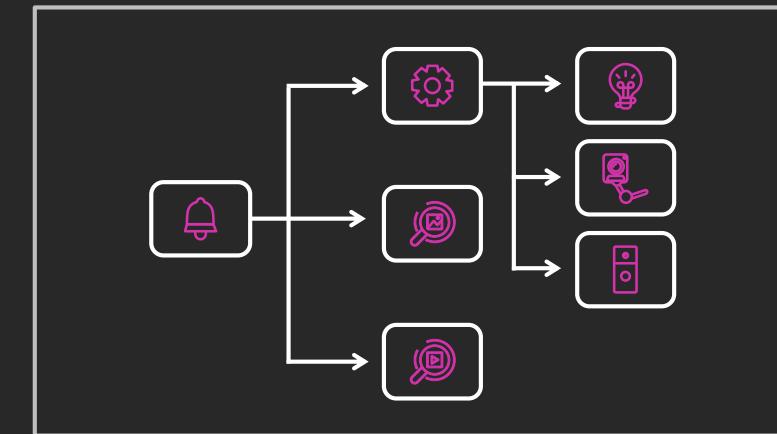
AWS IoT Things Graph



AWS IoT Things Graph helps you rapidly build IoT applications by combining devices and web services and defining the interactions between them with little to no code



Easily combine devices from different manufacturers



Visually design applications by connecting devices and services



Deploy and monitor at the edge so applications can run locally



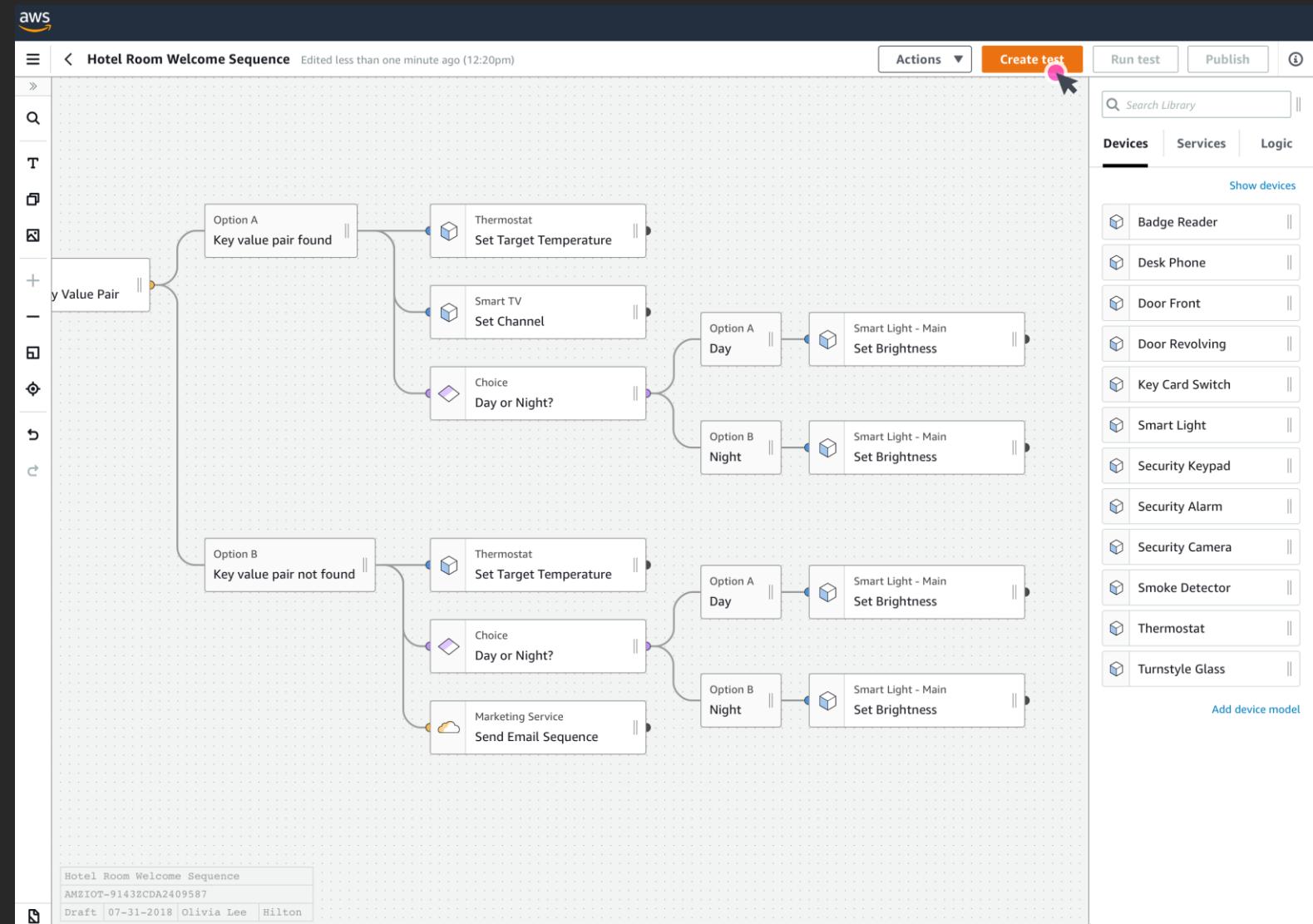
Control services

New Service!
Preview

AWS IoT Things Graph



Control
services





[x]cube LABS

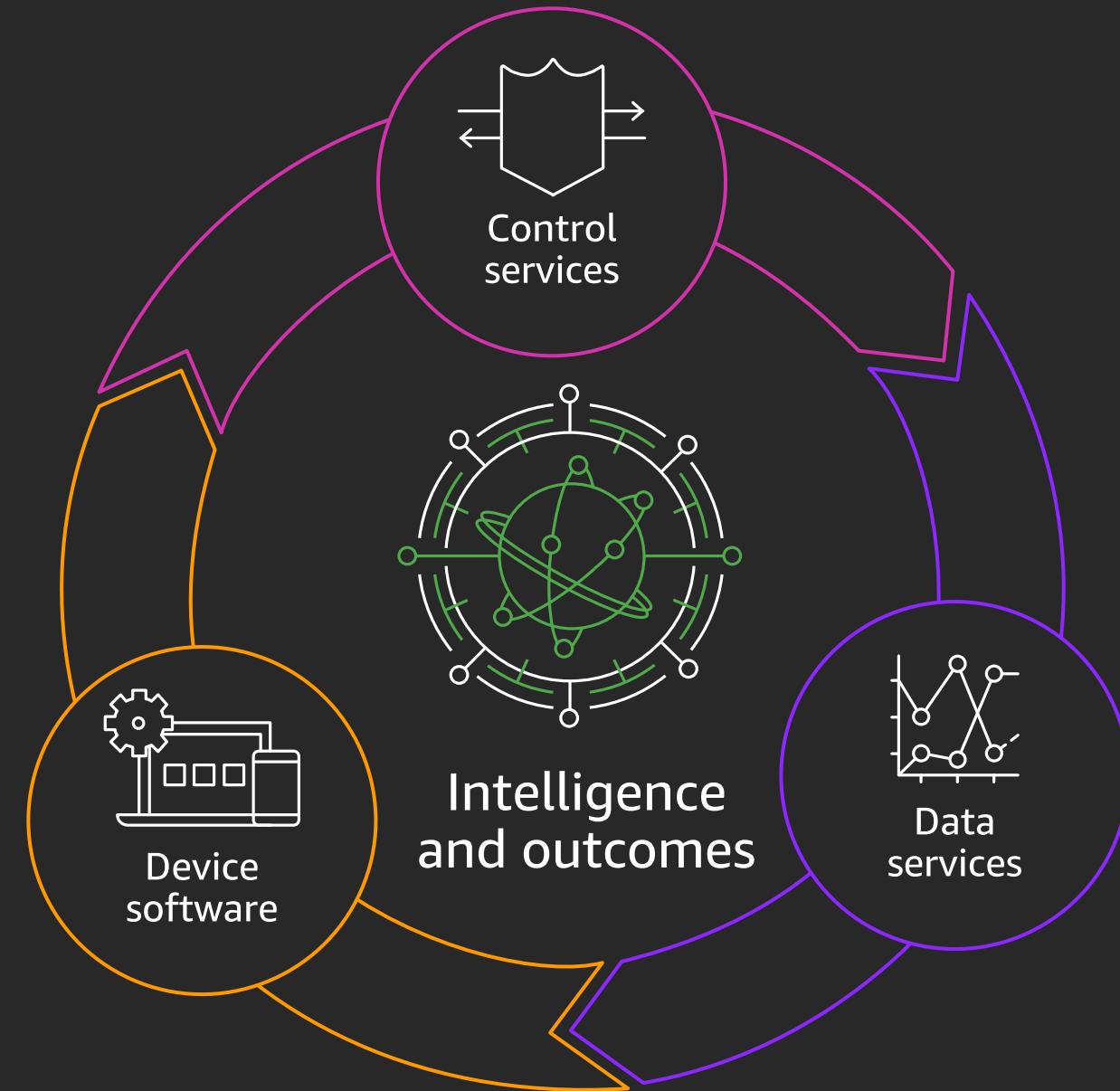
Smart cell tower monitoring

Ensure 24/7 availability of backup power for cell towers

AWS IoT Things Graph automation:
Low fuel tank triggers SNS notification to service team, turns on lights to signal condition



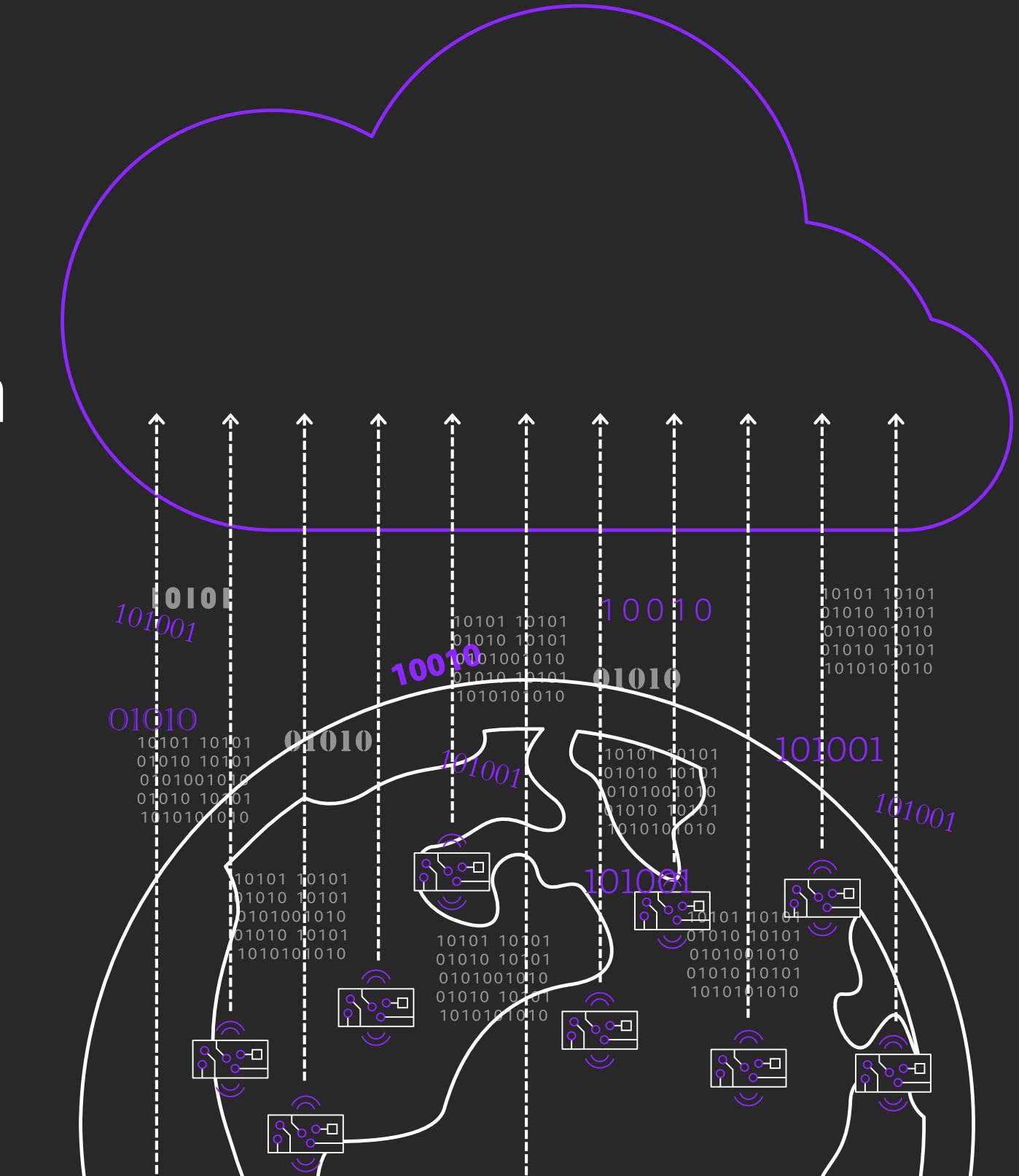
IoT virtuous cycle



How do I extract value from my noisy IoT data?



AWS re:Invent



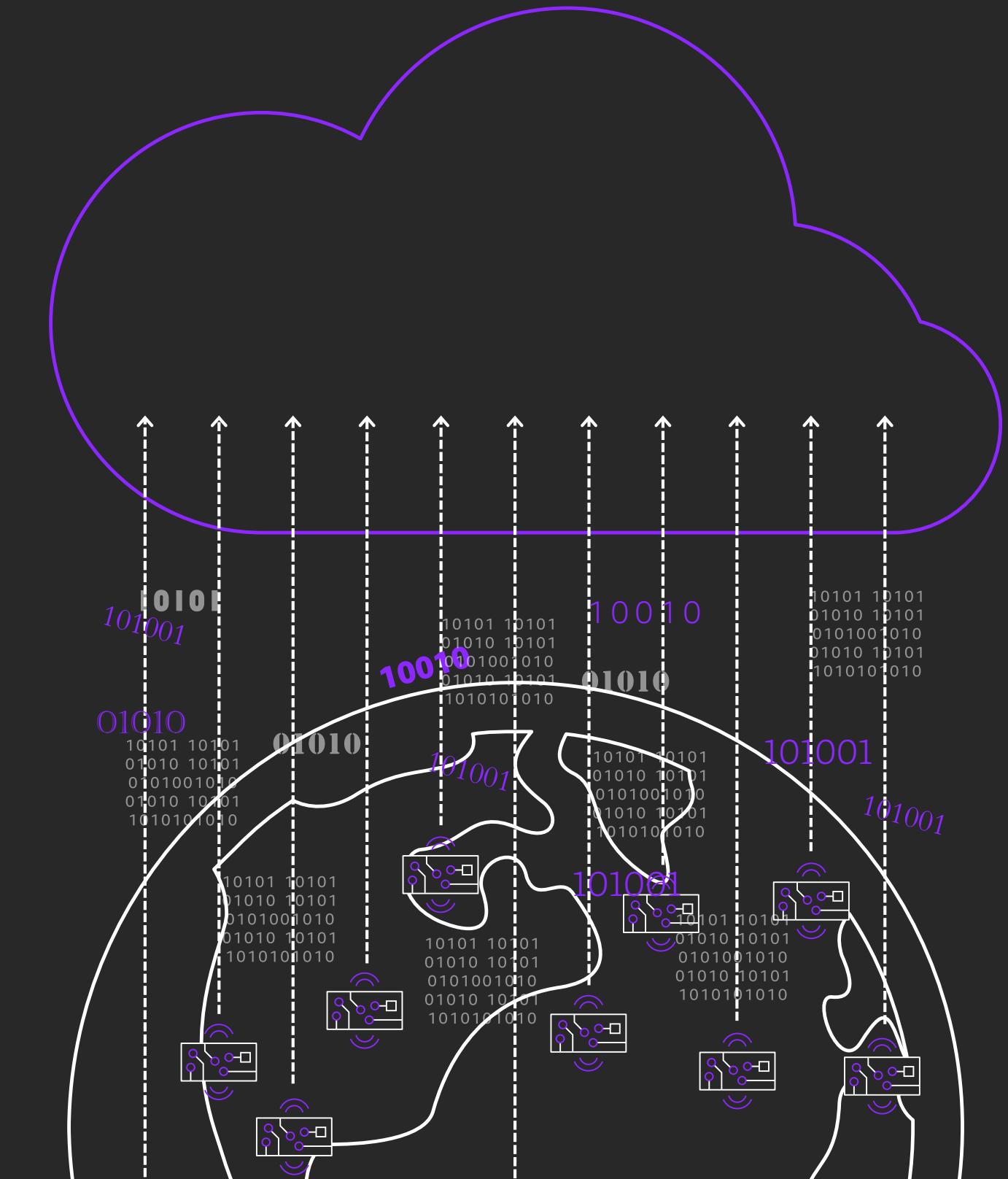
AWS IoT Analytics



Run and operationalize sophisticated analytics on massive volumes of IoT data



AWS re:Invent



AWS IoT Analytics



Run and operationalize sophisticated analytics on massive volumes of IoT data

**Process, enrich, store, analyze,
and visualizes IoT data in one service**



AWS re:Invent



AWS IoT Analytics

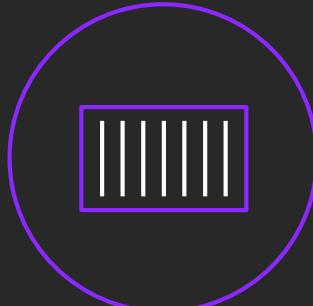


Run and operationalize sophisticated analytics on massive volumes of IoT data

Process, enrich, store, analyze, and visualize IoT data in one service



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Bring your own container
Use your own logic for custom analysis



Container execution automation
Plan and execute your analysis when you need it



Customizable time windows
Improve analysis efficiency and lower costs by scanning new incremental data only

VANTAGE POWER



The Mission – Electrify and Connect



The Problem

NEWS

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STM keeps buying hybrid buses, even though the technology is faulty



JASON MAGDER,
MONTREAL
GAZETTE

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November 16, 2018

Updated:
November 16, 2018 1:21 PM PST

Filed Under:
[The Province](#) › [News](#) ›
[Local News](#)



Toronto Finds Hybrid Buses Unreliable, Switches Back to Diesel

The Problem

- We were about to put out totally new hardware
- We were confident it would work, but what about in 5 years' time? 10 years?
- No-one can know for sure because so much of the underlying tech was new and you can't test for every scenario
- Given the operational and safety critical nature of the industry, these answers need solving
- How?

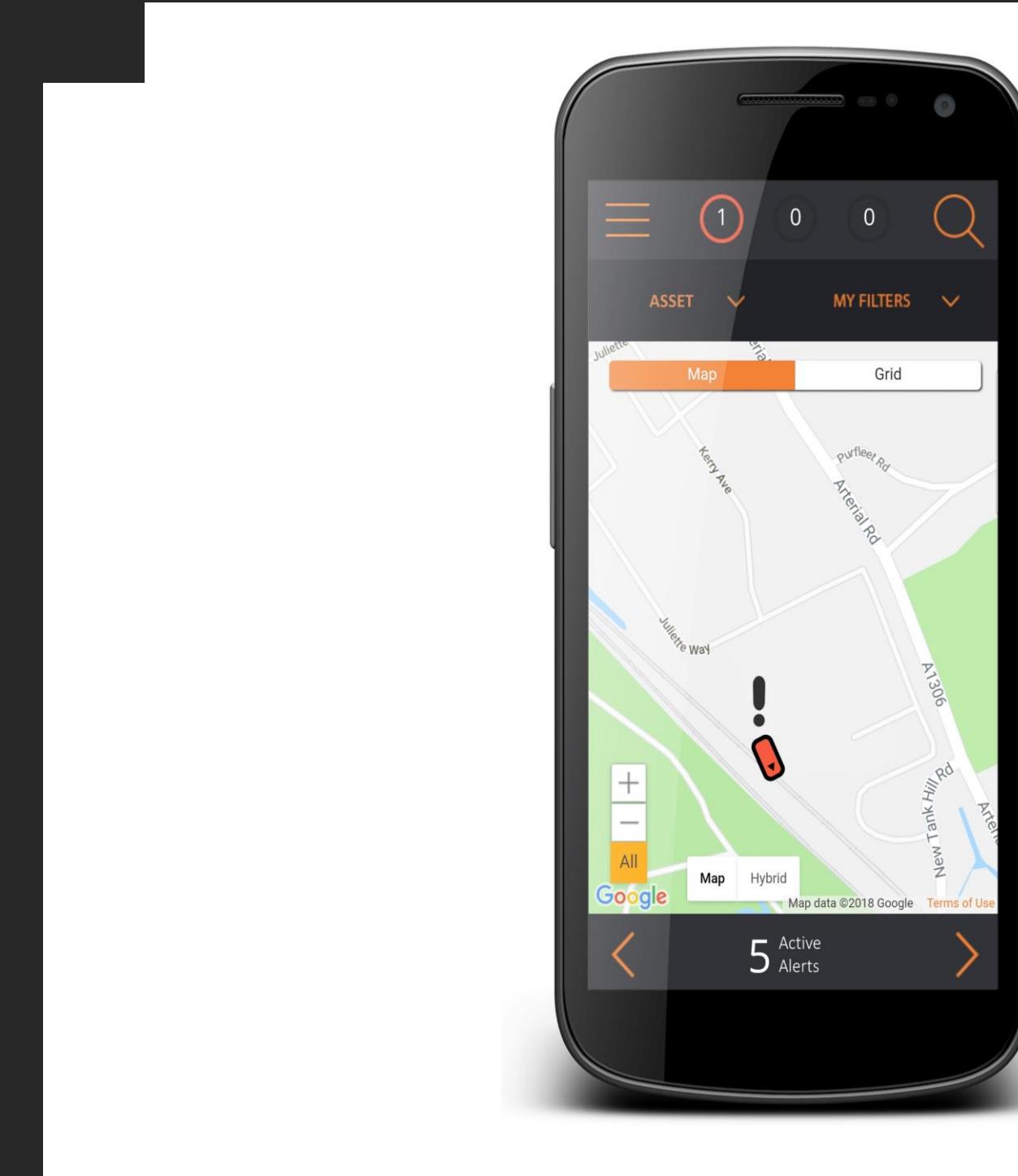


The Solution

- Develop a system to predict these failures long before they could cause problems

LUXoft

- Created a cloud-based architecture using Amazon Sagemaker, IoT Greengrass and IoT Analytics
- VPVision has enabled truly remarkable capabilities.



Example: Prognostics

- Each battery contains thousands of cells
- Any one of them could be a source of failure or potential safety incident
- The point where a fault can be detected by on-board system is too late.
- AWS has enabled a model to be trained that detects the fault over 1 month earlier.
- Service intervention planned in advance / service disruption is minimised / performance is maintained.



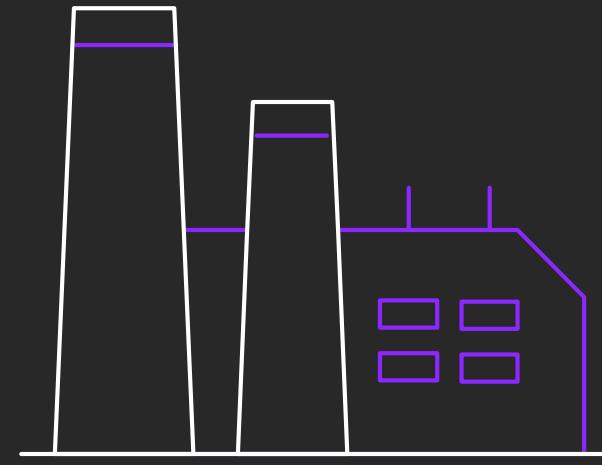
Benefits

- Battery fault – 1 month earlier warning
- Belt drive fault – 4 month earlier warning
- Product deployment is no-longer the end of product development – it could be the start
- Repercussions back through the business and operating models
- Scalable to a wide range of other applications

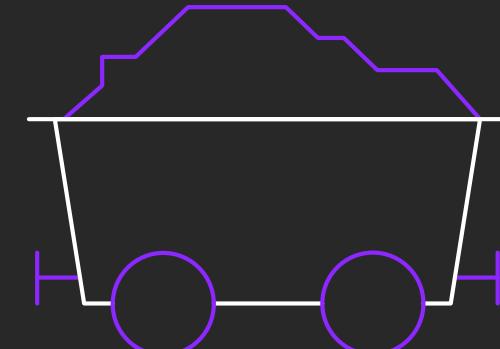


IoT transforms traditional industrial processes

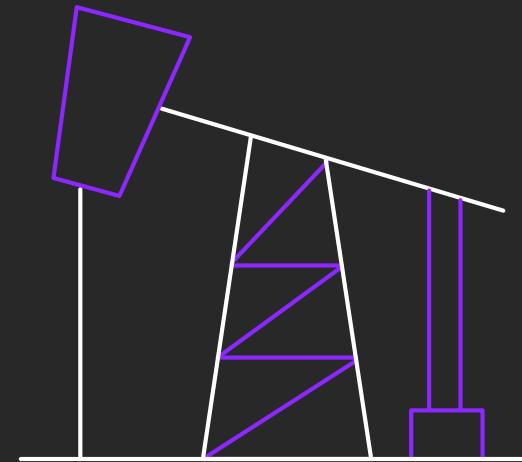
Most data collected on premises is never analyzed and thrown away



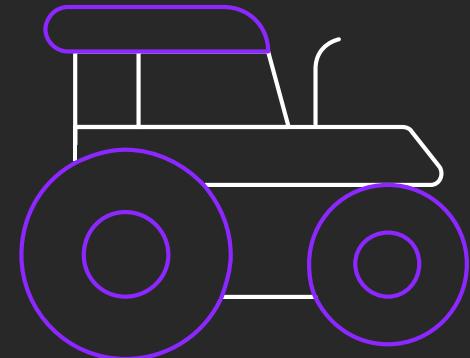
Manufacturing



Mining



Oil and gas



Agriculture

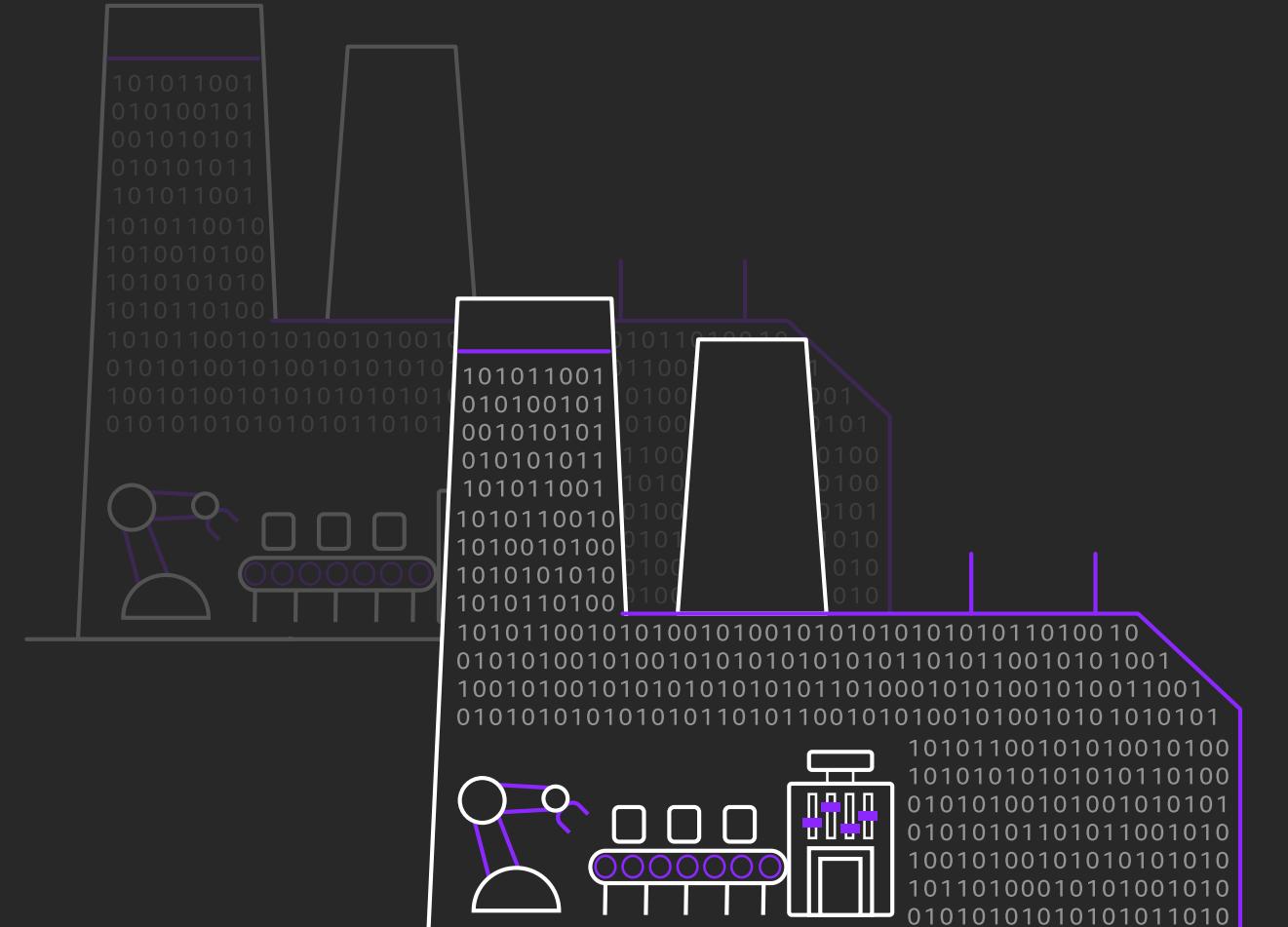
How can I liberate data that is locked in industrial facilities?



Data
services

AWS
re:Invent

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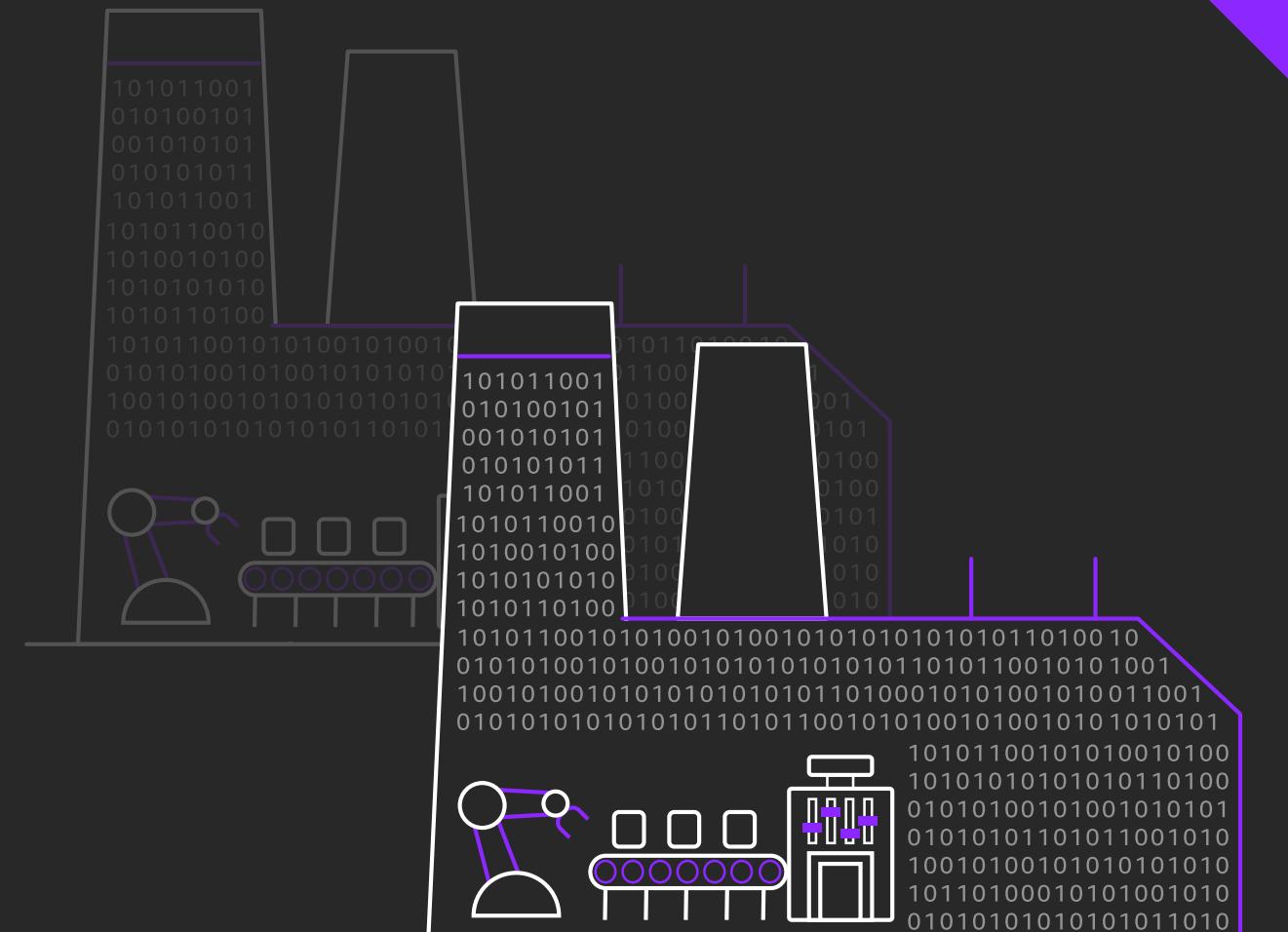
AWS IoT SiteWise



Collect data with local gateway,
and structure & search IoT data
from industrial equipment at scale



Data services



AWS IoT SiteWise



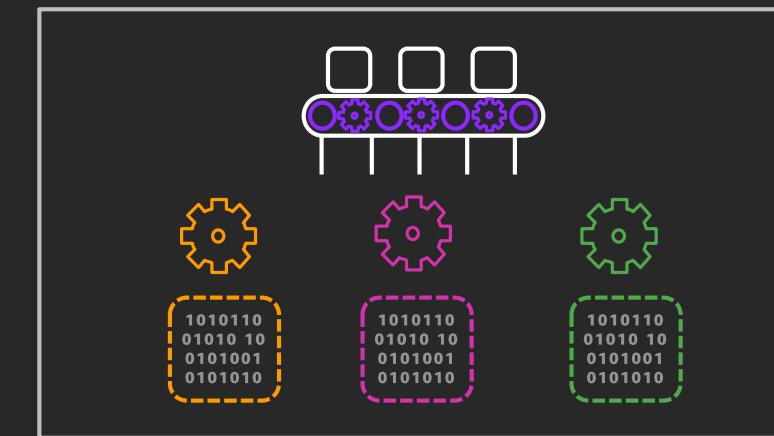
AWS IoT SiteWise collects data from the plant floor with local gateway, structures & labels that data, and generates real time KPIs & metrics to make better data-driven decisions



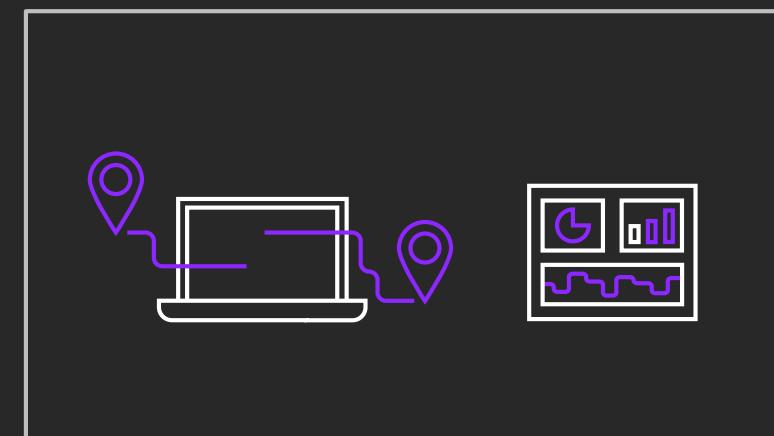
See your data flowing in minutes without writing code, just connect and configure your gateway



Data services



Structure your data and specify performance metrics for your assets and processes



Easily browse equipment and process data, build data views to identify inefficiencies, diagnose issues, and improve cross-facility processes



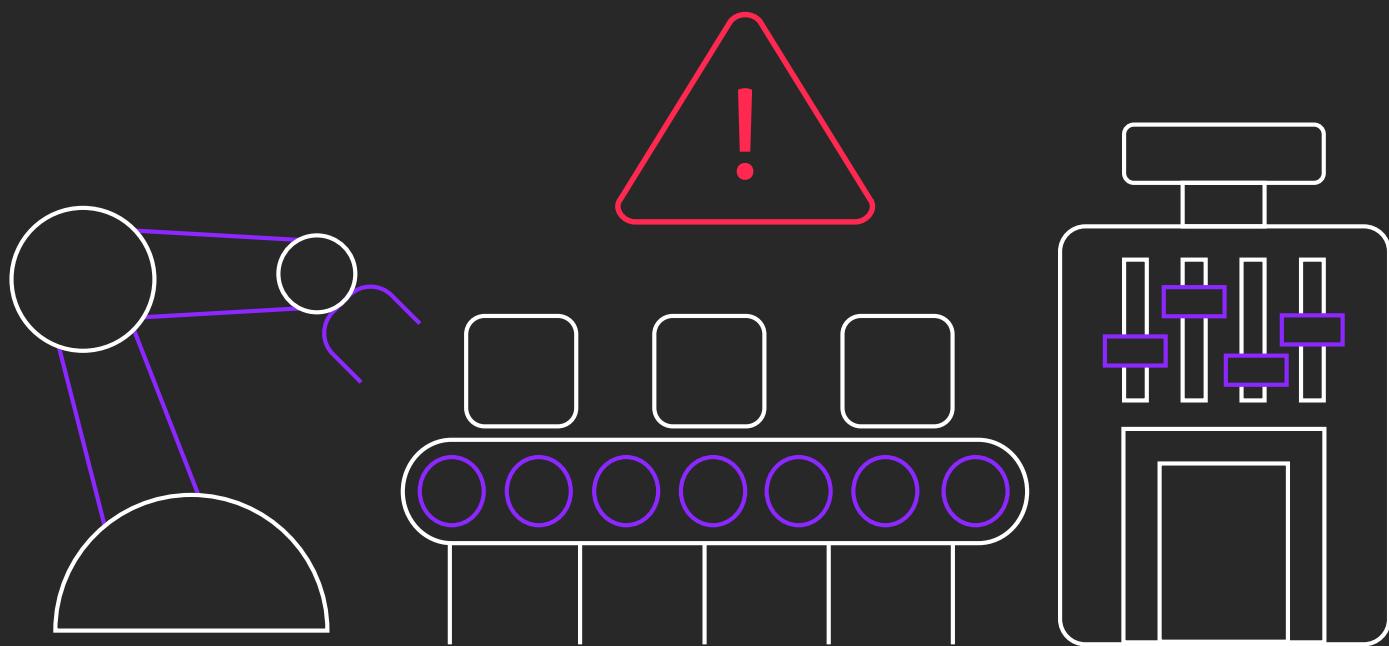
Bayer CropScience

Bayer is committed to reducing crop waste across the food processing supply chain

Using [AWS IoT SiteWise](#), Bayer is exploring digital manufacturing for crop processing to identify and prevent process loss in real time

13% of all food produced globally is lost in manufacturing

How can I detect changes across complex IoT systems?



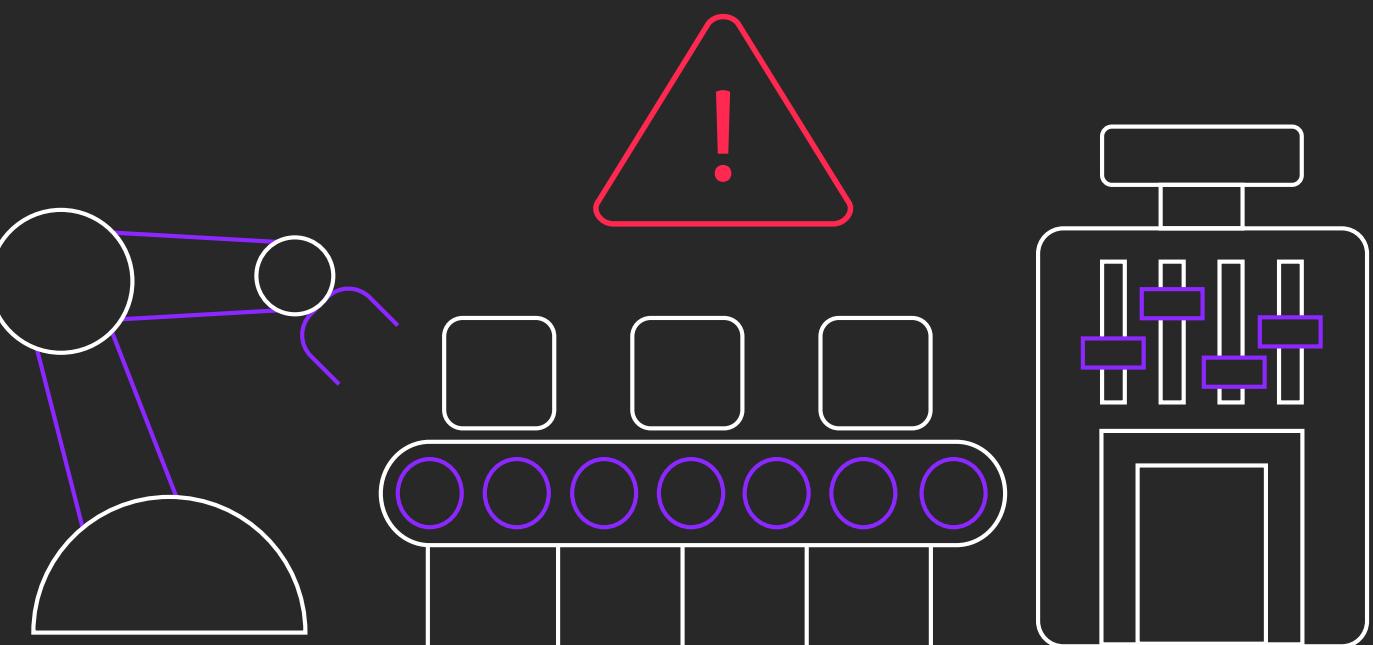
Data
services

New Service!
Preview

AWS IoT Events



Detect and respond to events
from data across IoT sensors
and applications

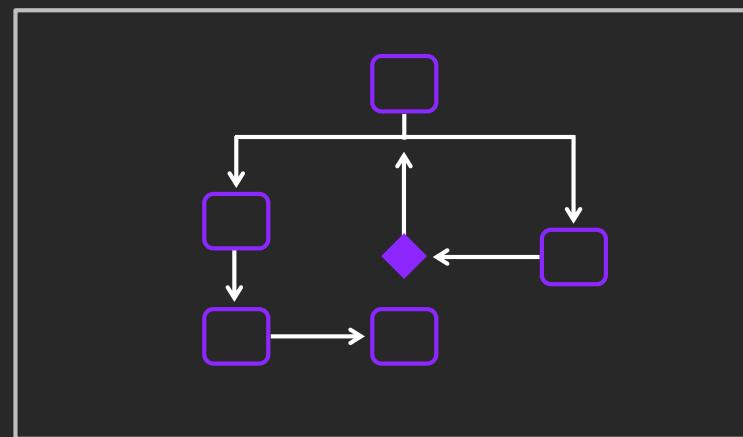


Data
services

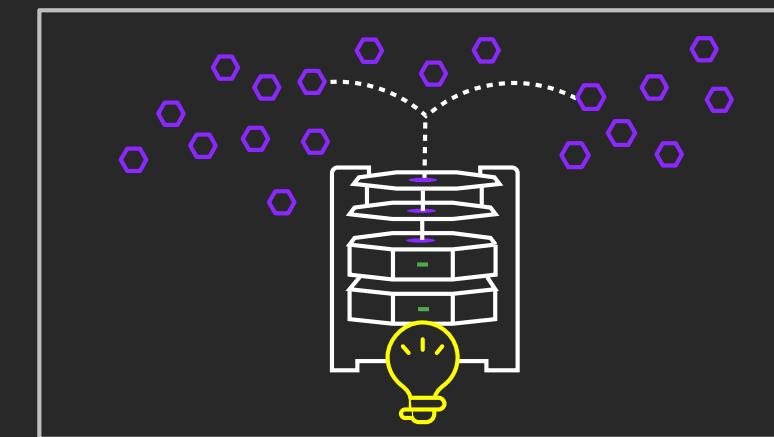
AWS IoT Events



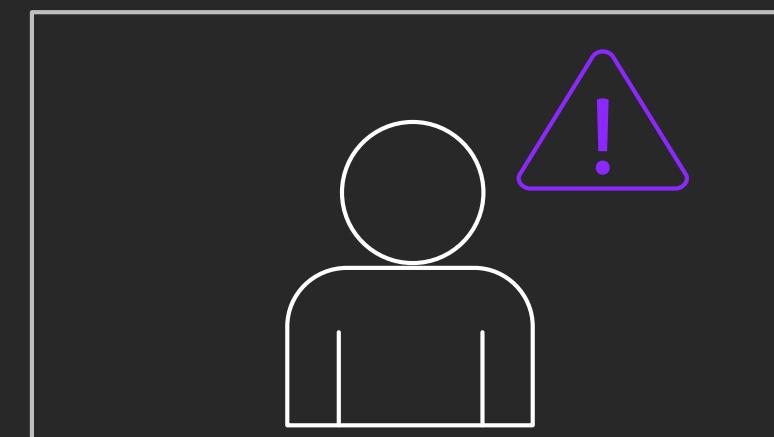
AWS IoT Events allows you to continuously monitor data from your equipment and fleets of devices for changes in operation, and to trigger the appropriate response when events occur



Build simple logic to evaluate incoming telemetry data to define events in equipment or a process.



Detect events from data across thousands of sensors and other sources



Trigger responses to optimize operations



Data
services



Onica's [IoTanium IoT Platform](#)
with complex event detection
using [AWS IoT Events](#)

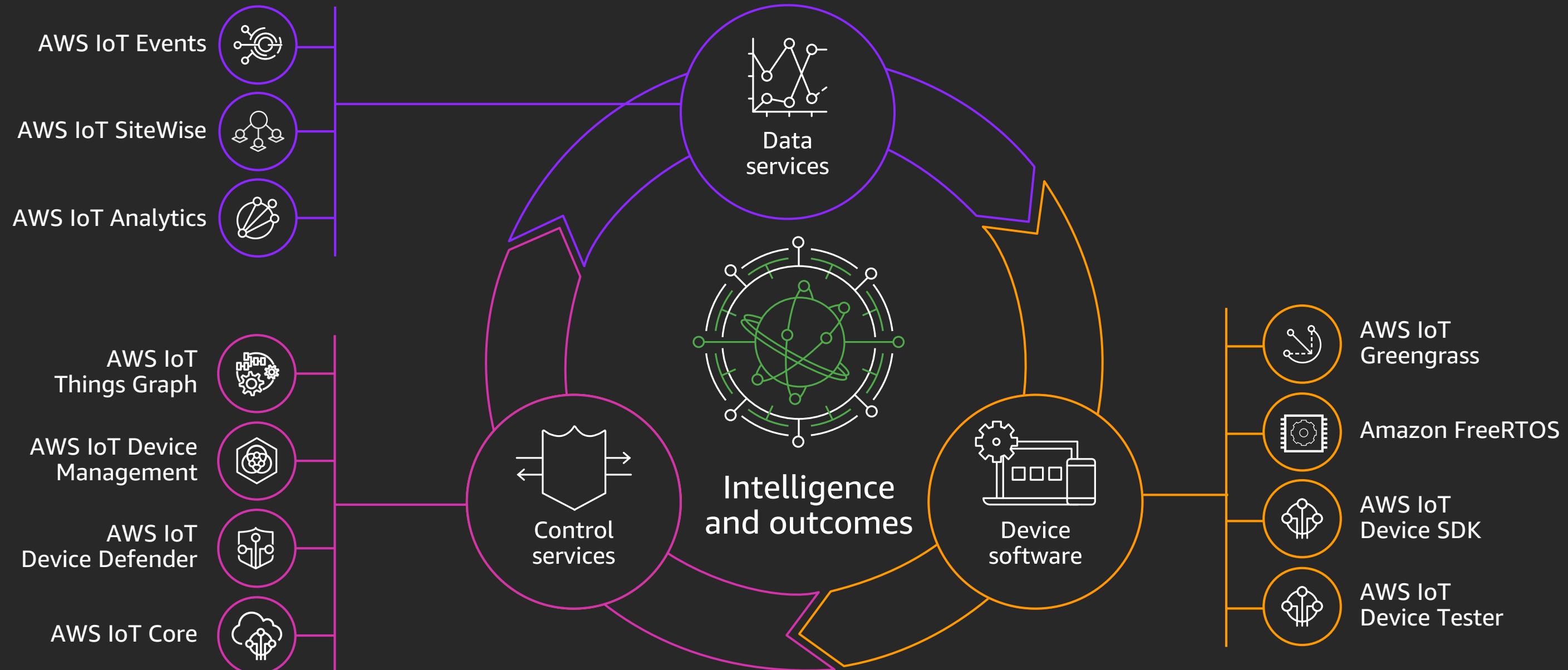
The future of micro mobility
depends on ride providers ability
to reduce loss and damages to
profitable levels.

A close-up photograph of the rear section of a black and orange electric scooter. The frame is black, and the wheels and fenders are orange. The background is blurred, suggesting motion or an outdoor setting.

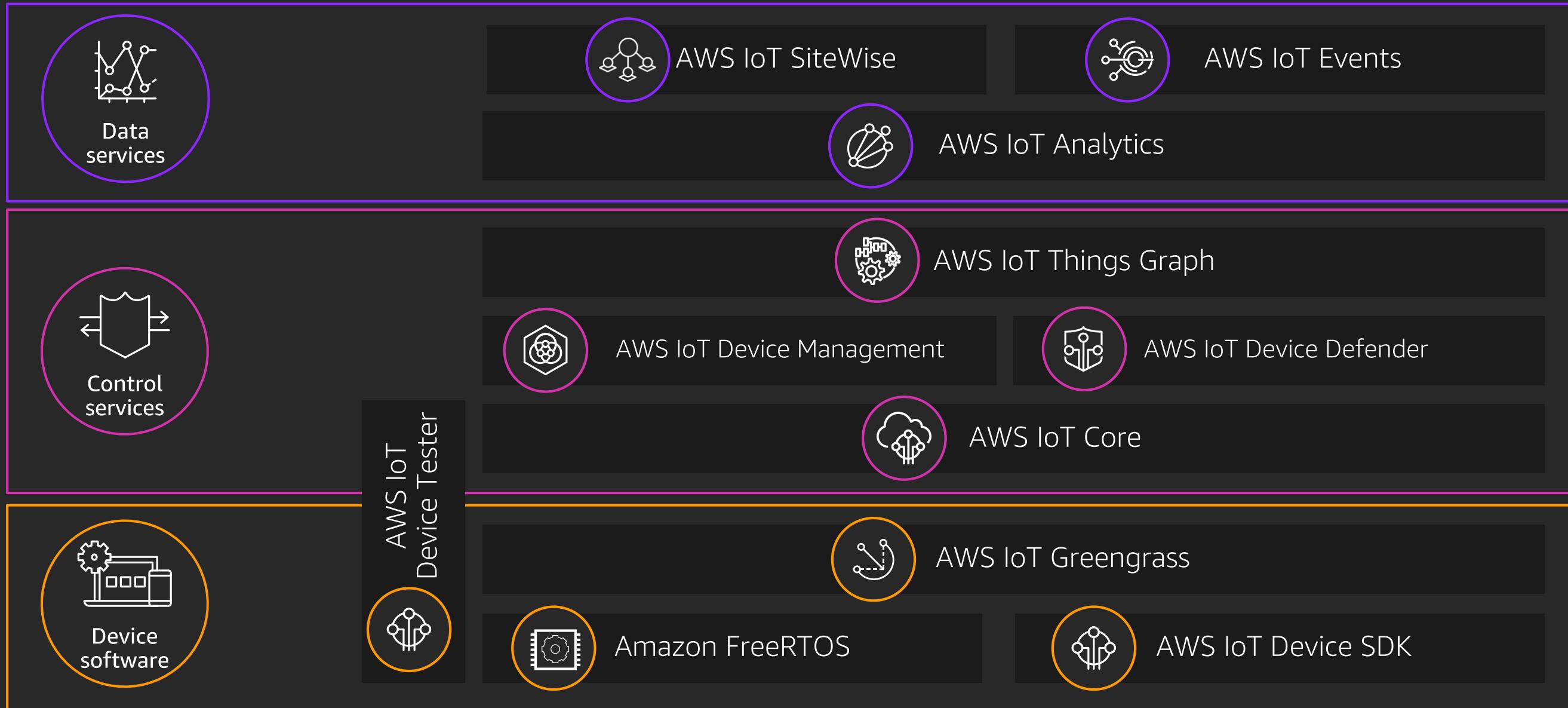
Detecting and
remediating theft with
AWS IoT Events

San Francisco:
200 scooters stolen
in the first 2 weeks

IoT virtuous cycle

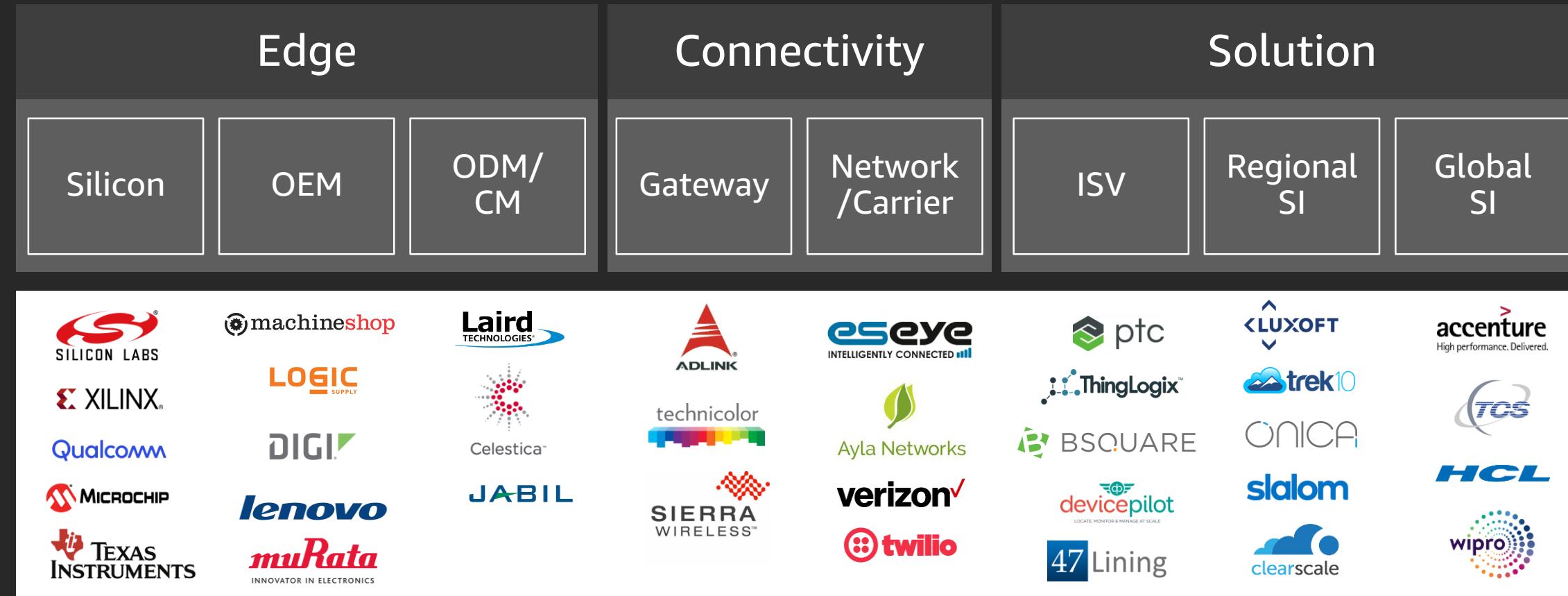


AWS IoT architecture



AWS IoT partner network

Delivering use case specific applications and solutions



Why AWS IoT?

Broadest and deepest functionality

Breadth and depth spanning the edge to the cloud, so you can build IoT applications for virtually any use case across a wide range of devices

Superior integration with AI

Build, train, and optimize models in the cloud, and then deploy them to the edge so that devices can get smarter over time and you can take actions as events unfold

Multi-layered security

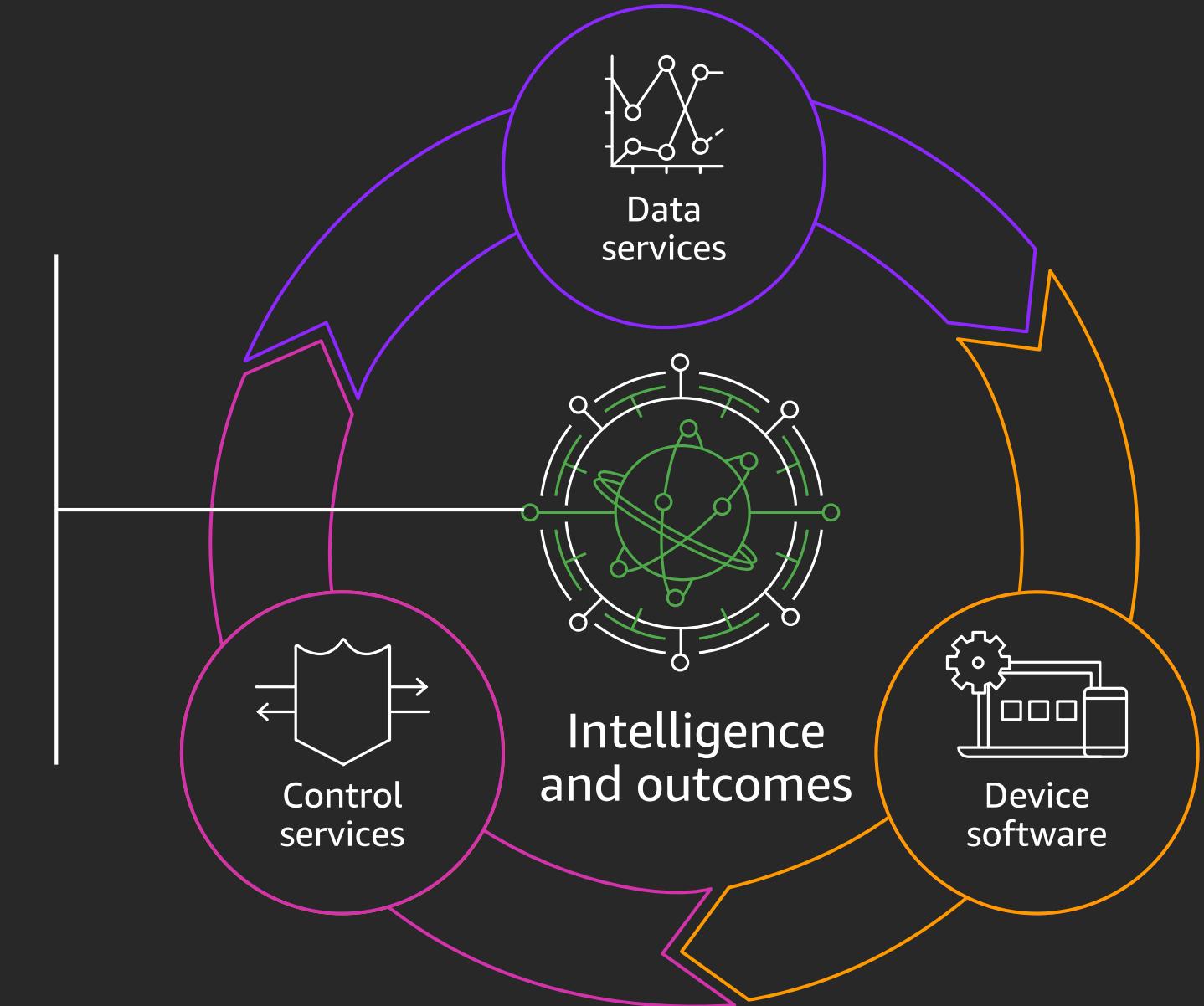
Preemptive built-in device authentication, authorization and data encryption, reactive auditing and threat detection to keep your devices, fleets and data secure

Proven experience at scale

Most scalable, secure, and proven cloud infrastructure that supports the largest volume of data coming from millions of different devices and billions of messages

Now that you **know** the state of every thing, and **can** reason on top of that data, what problems would you solve?

aws.amazon.com/iot



Thank you!

Dirk Didascalou
VP of AWS IoT



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