AWS re:Invent

IOT222-L

Leadership session: Transform industries with AWS IoT

Dirk Didascalou
VP, AWS IoT
Amazon Web Services

AWS re:Invent

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aws

If you knew the state of every thing
and could reason on top of that data…

What problems would you solve?

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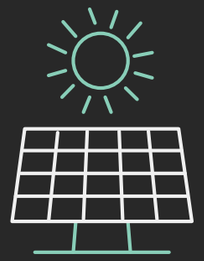
AWS IoT customers solve problems in all sectors



What customers are doing with AWS IoT



Improve the performance and productivity of industrial processes



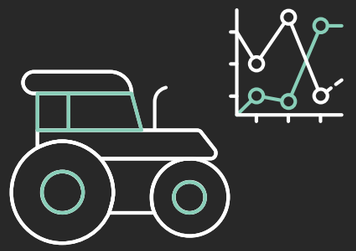
Manage energy resources more efficiently



Remotely monitor patient health & wellness applications



Transform transportation with connected and autonomous vehicles



Grow healthier crops with greater efficiencies



Track inventory levels and manage warehouse operations

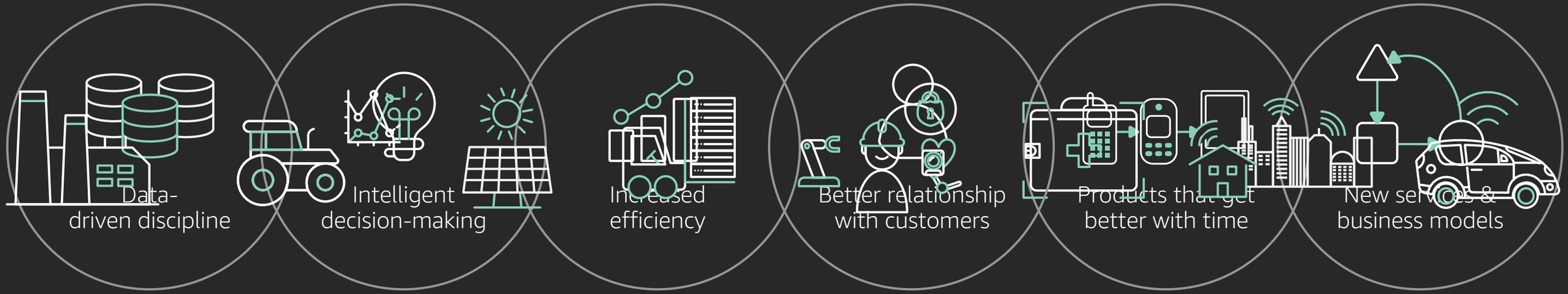


Enhance safety in the home and the office and on the factory floor



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

What customers are doing with AWS IoT



Operational efficiency

IoT data decreases OpEx

Revenue growth

IoT data drives business growth

What are the fundamentals of AWS IoT?

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Analytics Services

How can I make sense of my IoT data and take actions to solve business problems?



Connectivity & Control Services

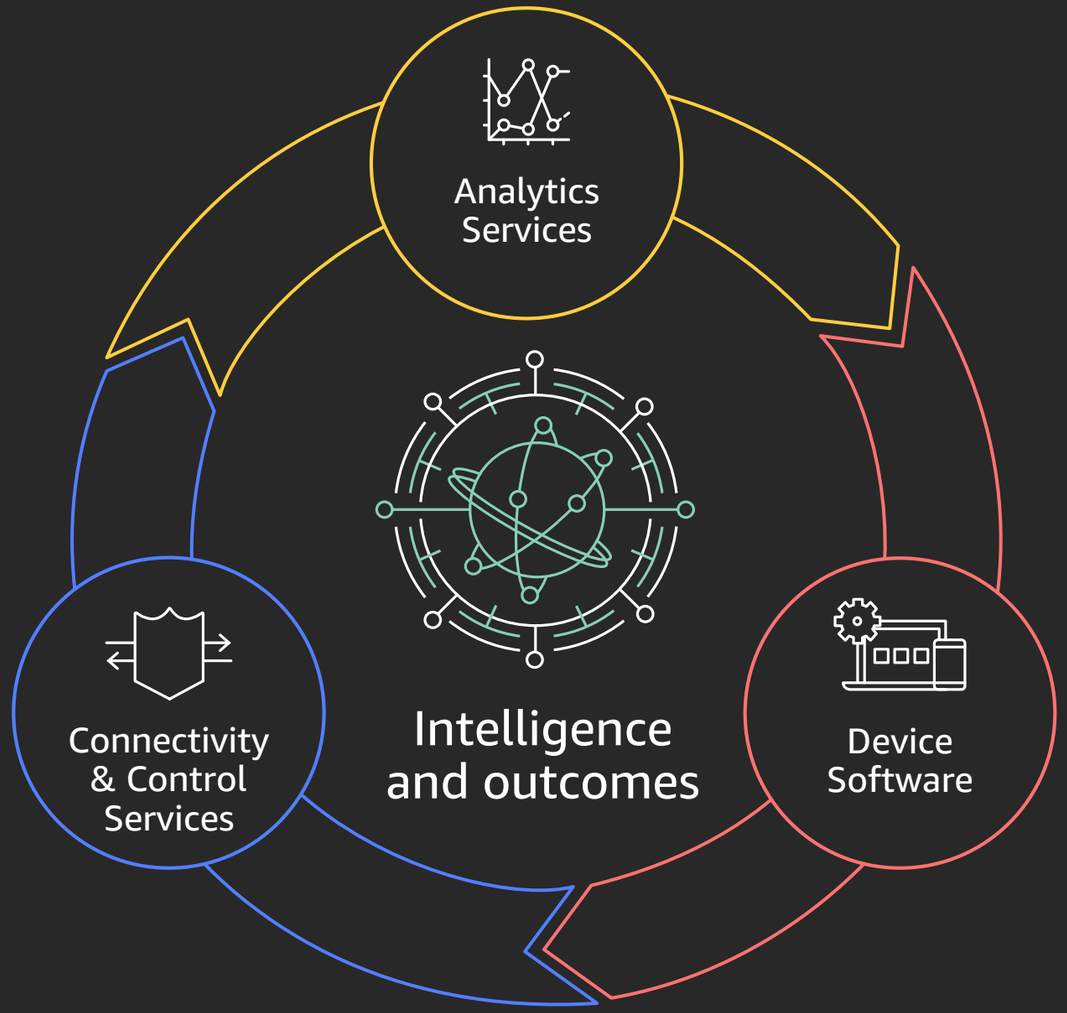
How can I connect, manage, and secure my devices at scale?



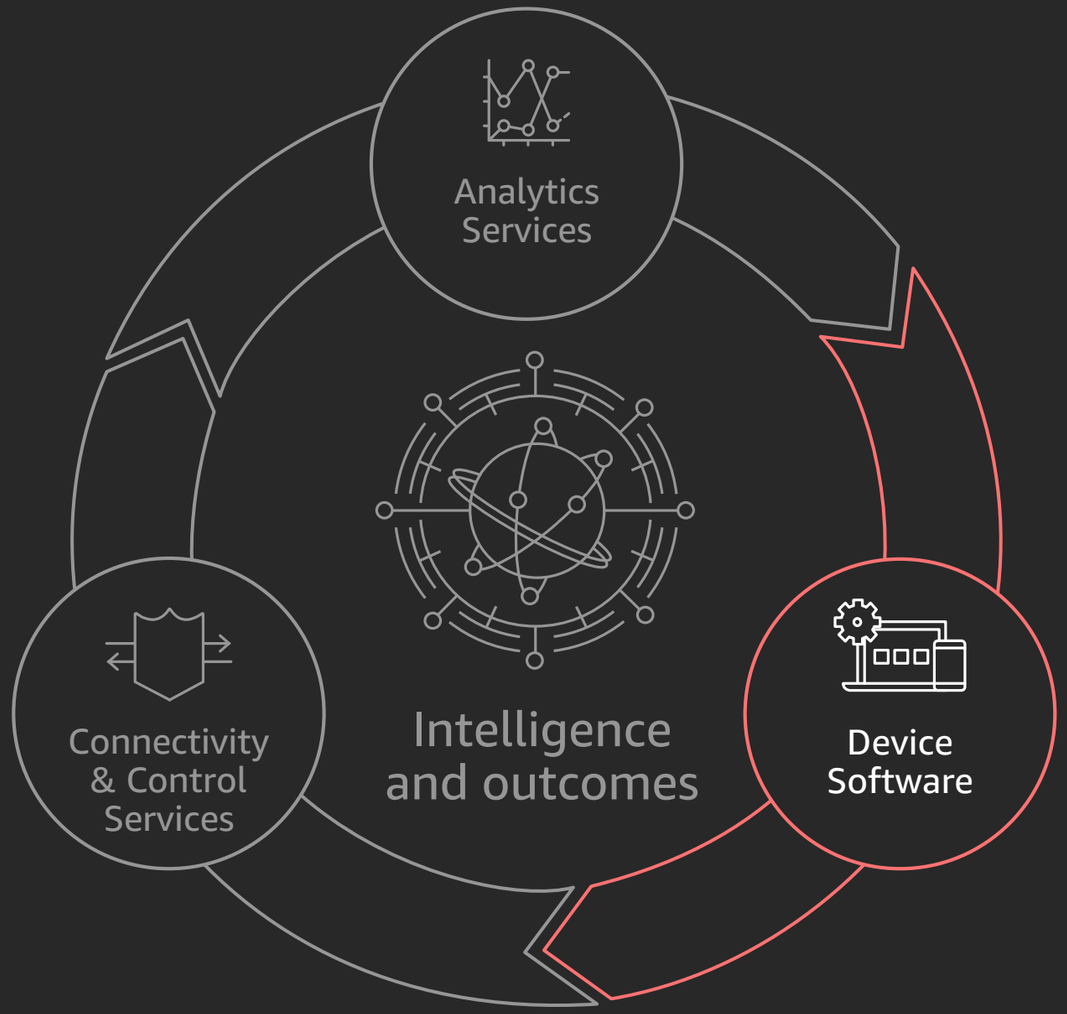
Device Software

How can I build devices that operate at the edge that work with AWS by default?

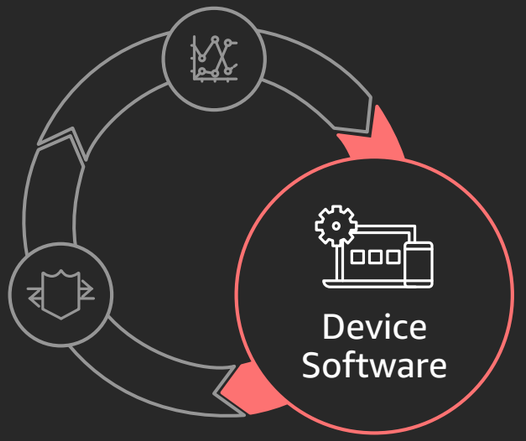
IoT virtuous cycle

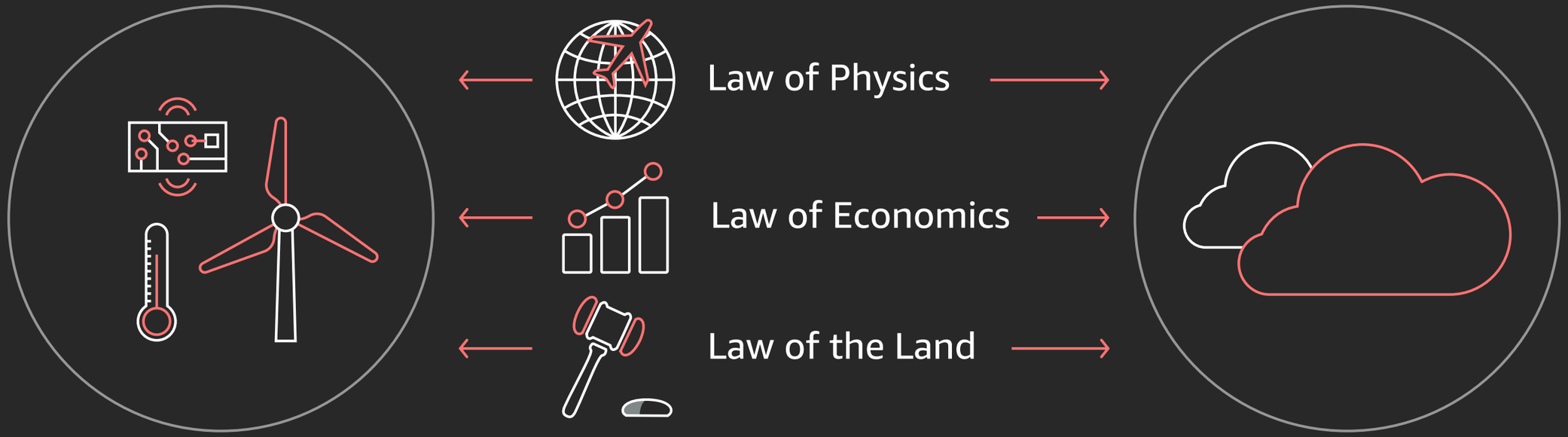


How can I build devices that operate at the edge and that work with AWS by default?

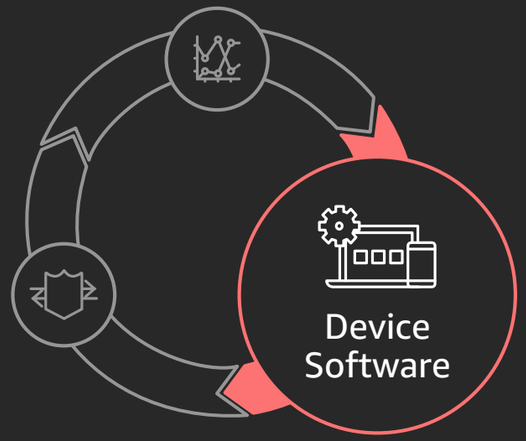


Three laws


Device
Software


Law of Physics
Law of Economics
Law of the Land
Edge
Cloud

How can I build devices that operate at the edge and that work with AWS by default?

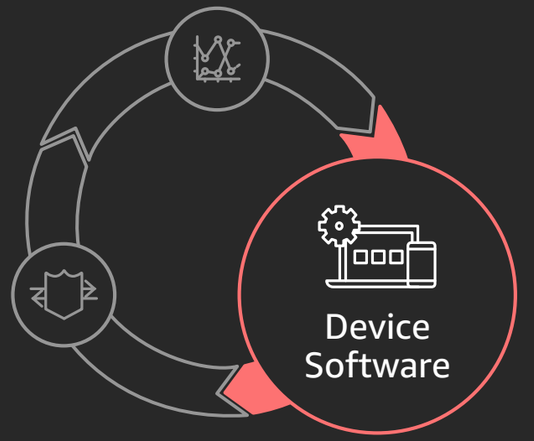


How can I build any type of device that operates at the edge and connects to AWS IoT?

How can I extend AWS Cloud capabilities to the edge?

How will I know that my devices will work with AWS IoT?

How can I build devices that operate at the edge and that work with AWS by default?



Amazon FreeRTOS

An operating system for microcontrollers that allows you to easily build small, low-power edge devices that connect to AWS IoT.

AWS IoT Device SDK

Allows you to easily and quickly connect any hardware device or mobile device to AWS IoT.

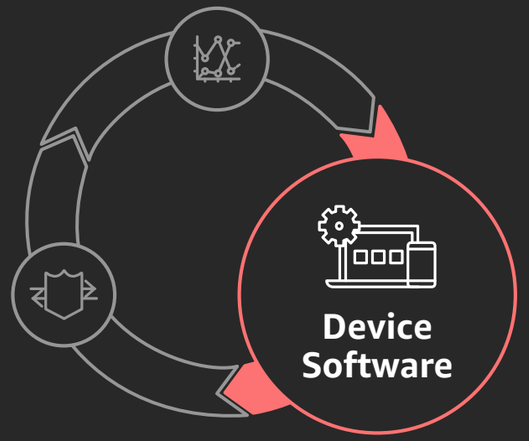
AWS IoT Greengrass

Extends AWS to edge devices so they can act locally on the data they generate, while still using the cloud for management, analytics, and storage.

AWS IoT Device Tester

A test automation tool for IoT devices that you can use to easily determine whether your device will run Amazon FreeRTOS or AWS IoT Greengrass and interoperate with AWS IoT services.

How can I extend AWS Cloud capabilities to the edge?



Amazon FreeRTOS

AWS IoT Device SDK

AWS IoT Greengrass

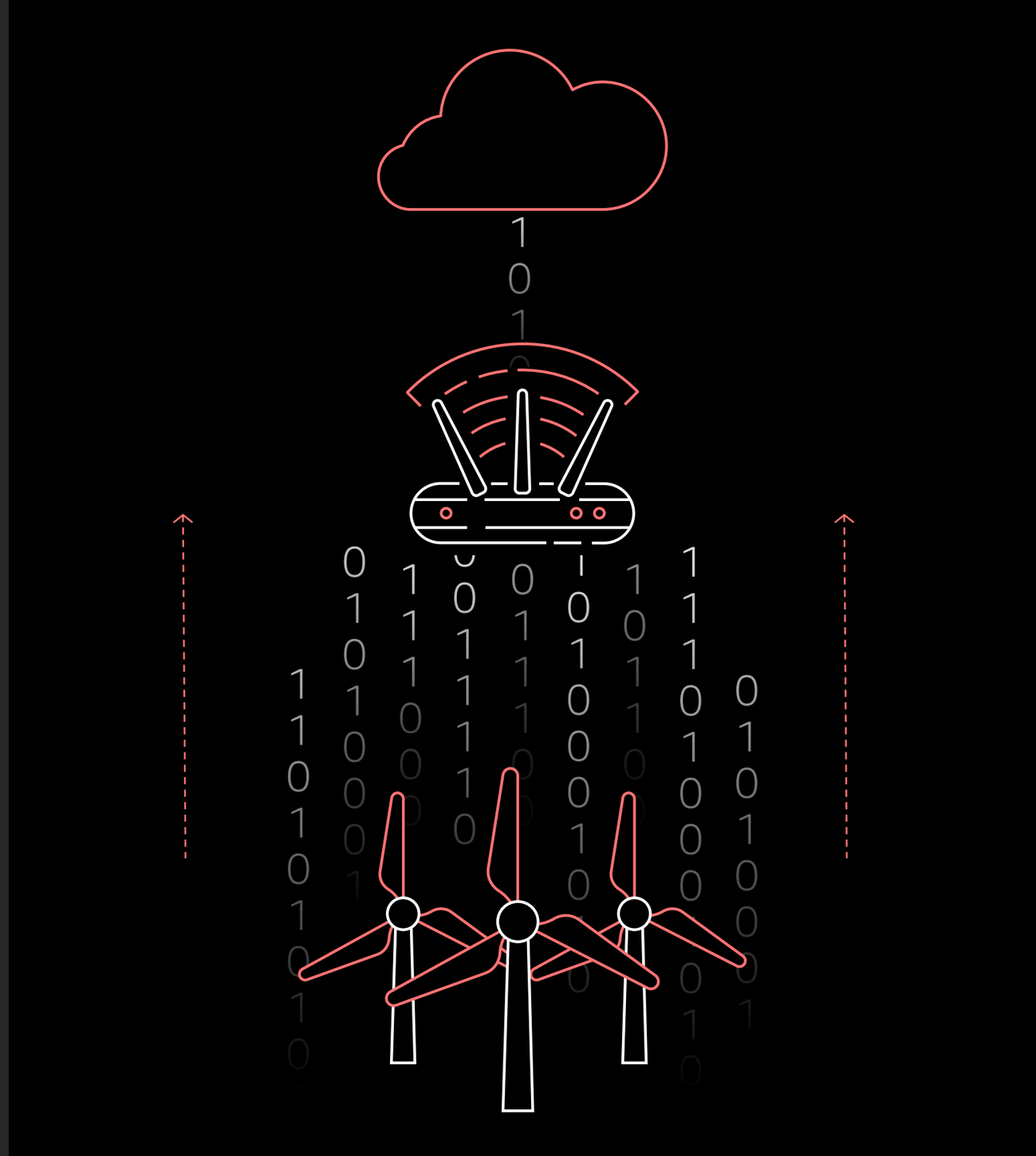
Local messaging
Local actions with AWS Lambda
State and data sync
Security & hardware integrations
Machine learning inference
Local resource access
Connectors
Over-the-air updates

AWS IoT Device Tester

How can I manage high-volume data streams at the edge, and into the cloud?



Device
Software



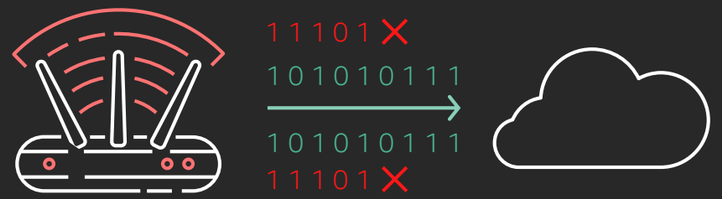
Stream Manager for AWS IoT Greengrass

New Feature!

Preconfigure policies for collecting, processing, and exporting high-volume data streams on edge devices



Set policies for how data is processed and managed locally on devices with limited storage and compute.



Prioritize how data is streamed to the cloud with intermittent or limited connectivity.



Stream data from edge devices directly to AWS services such as Amazon Kinesis and AWS IoT Analytics.



Device Software

LOCKHEED MARTIN

Problem

Lockheed Martin was looking to take the next leap in modern-day manufacturing and decision-making by creating a cyber-secure convergence of Operational Technology and Information Technology spanning its enterprise and facilities.

Solution

Lockheed Martin chose AWS IoT to power its Intelligent Factory solution. With Stream Manager for AWS IoT Greengrass, the company will securely and reliably export streams of telemetry and production data from across its facilities directly to AWS Kinesis Data Streams.

Impact

Lockheed Martin is able to capture valuable machine data across multiple business units, eliminate paper-based tracking and waste, optimize labor, and unlock insights into its manufacturing operations.

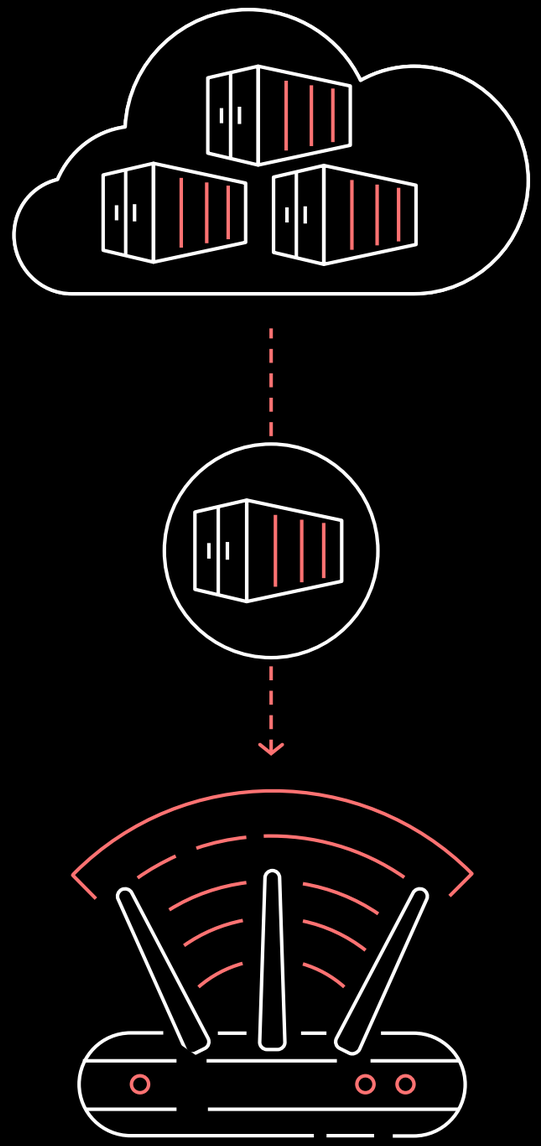


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How can I deploy containers seamlessly on edge devices?



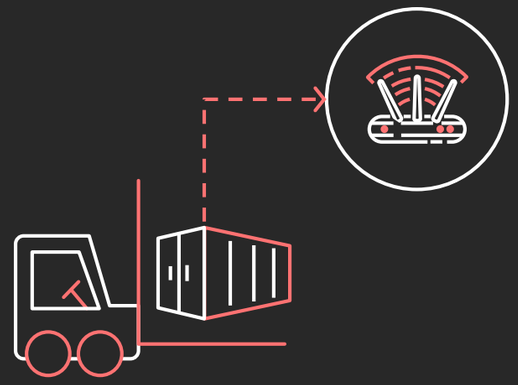
Device
Software



Container Support for AWS IoT Greengrass

New Feature!

Deploy containers seamlessly to your edge devices.



Move containers from the cloud to edge devices using AWS IoT Greengrass.



Enables both Docker and AWS Lambda components to operate seamlessly together at the edge.



Use AWS IoT Greengrass Secrets Manager to manage credentials for private container registries.



Device Software

ADLINK

Leading EDGE COMPUTING

Problem

ADLINK required more device and container management tools for their industrial edge solutions to help customers simplify the deployment of applications.

Solution

ADLINK integrated AWS IoT Greengrass into the manufacturing phase of their gateways as the software orchestration tool for the ADLINK Edge™ IoT solution.

Impact

Container Support for AWS IoT Greengrass enables ADLINK to launch all required containers for ADLINK Edge™.

"This is an exciting leap forward for our customers—they can now deploy diverse workloads on AWS IoT Greengrass without rewriting code.

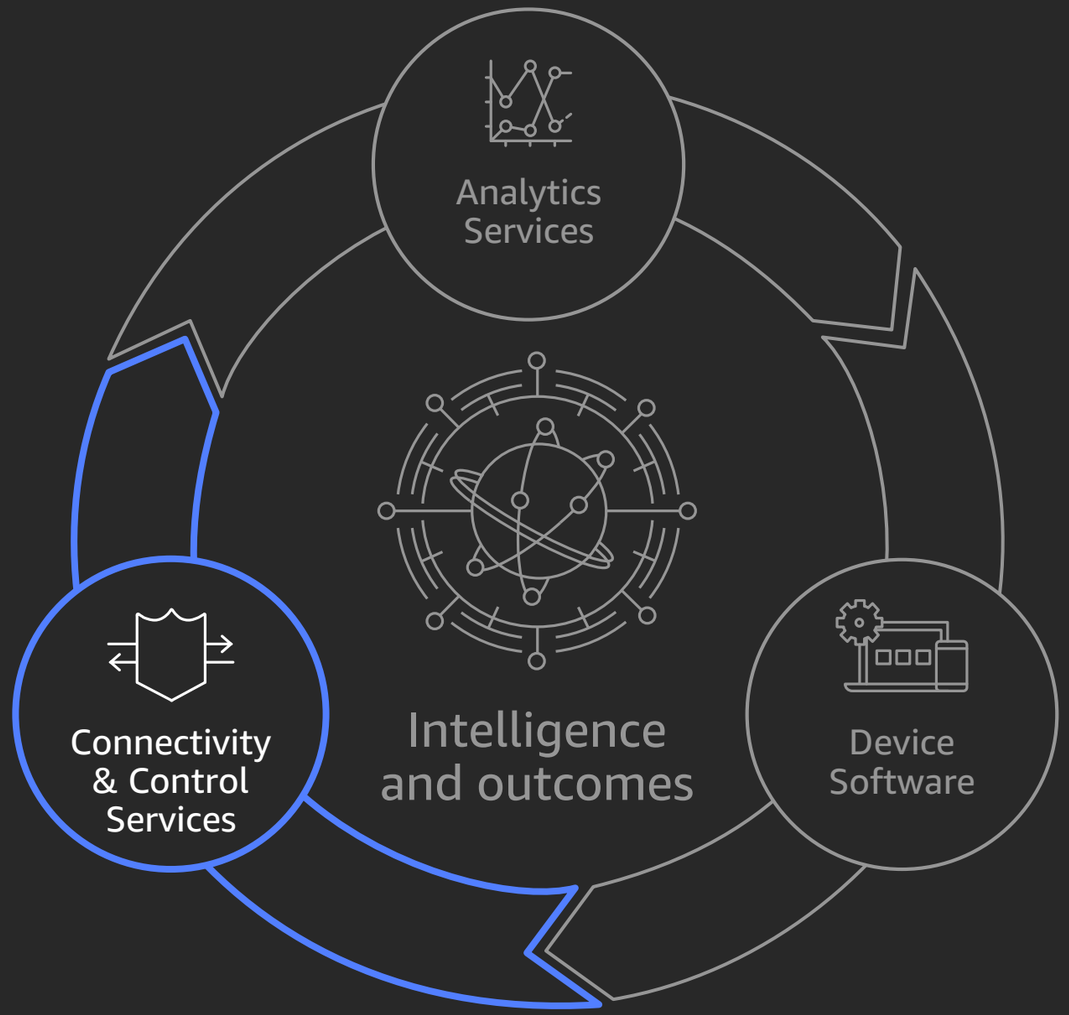
This means they can continue to develop new applications in languages and environments familiar to development teams."

Toby McClean

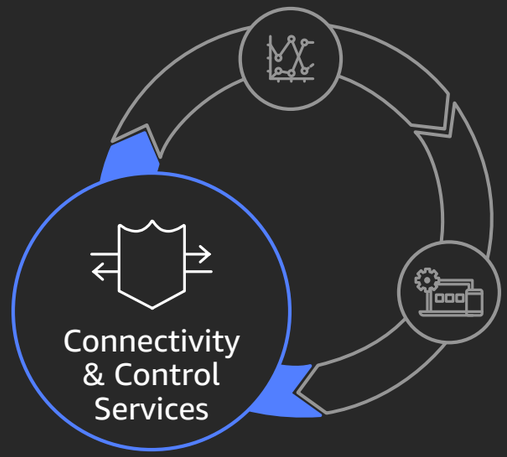
VP, IoT Solutions & Technology Innovation at ADLINK



How can I connect, manage, and secure devices at scale?



How can I connect, manage, and secure devices at scale?

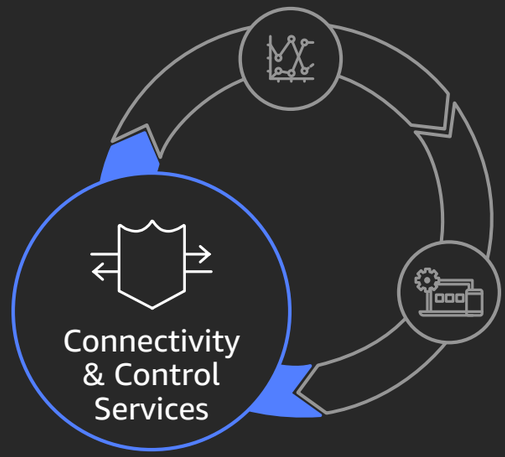


How can I securely connect my devices to the cloud and handle the data they generate at scale?

How can I manage my growing number of connected devices and keep my fleet healthy?

How can I ensure my connected devices stay secure?

How can I connect, manage, and secure devices at scale?



AWS IoT Core

A managed cloud service that lets connected devices easily and securely interact with cloud applications and other devices at scale.

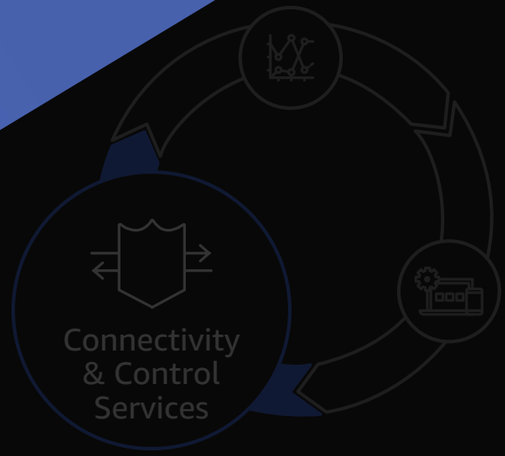
AWS IoT Device Management

Helps you register, organize, and remotely manage your connected devices and monitor fleet health.

AWS IoT Device Defender

Continuously audits your IoT configurations to ensure they do not deviate from security best practices, and detects anomalous device behavior.

How can I connect, manage, and secure devices at scale?



AWS IoT C… …nagement

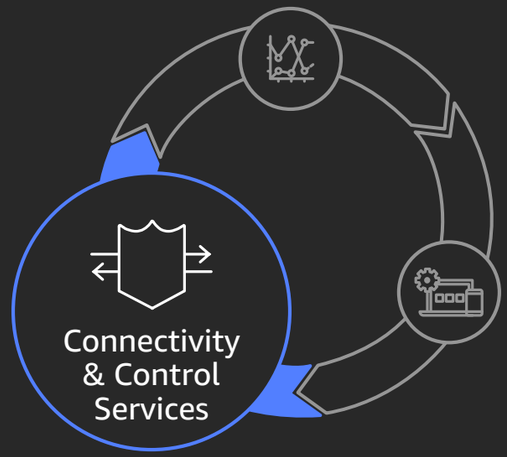
AWS IoT Device Defender

Audit

Detect

Best IoT Security Solution
at 2019 IoT World Awards

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



AWS IoT Core

Device gateway

Message broker

Authentication & authorization

Registry

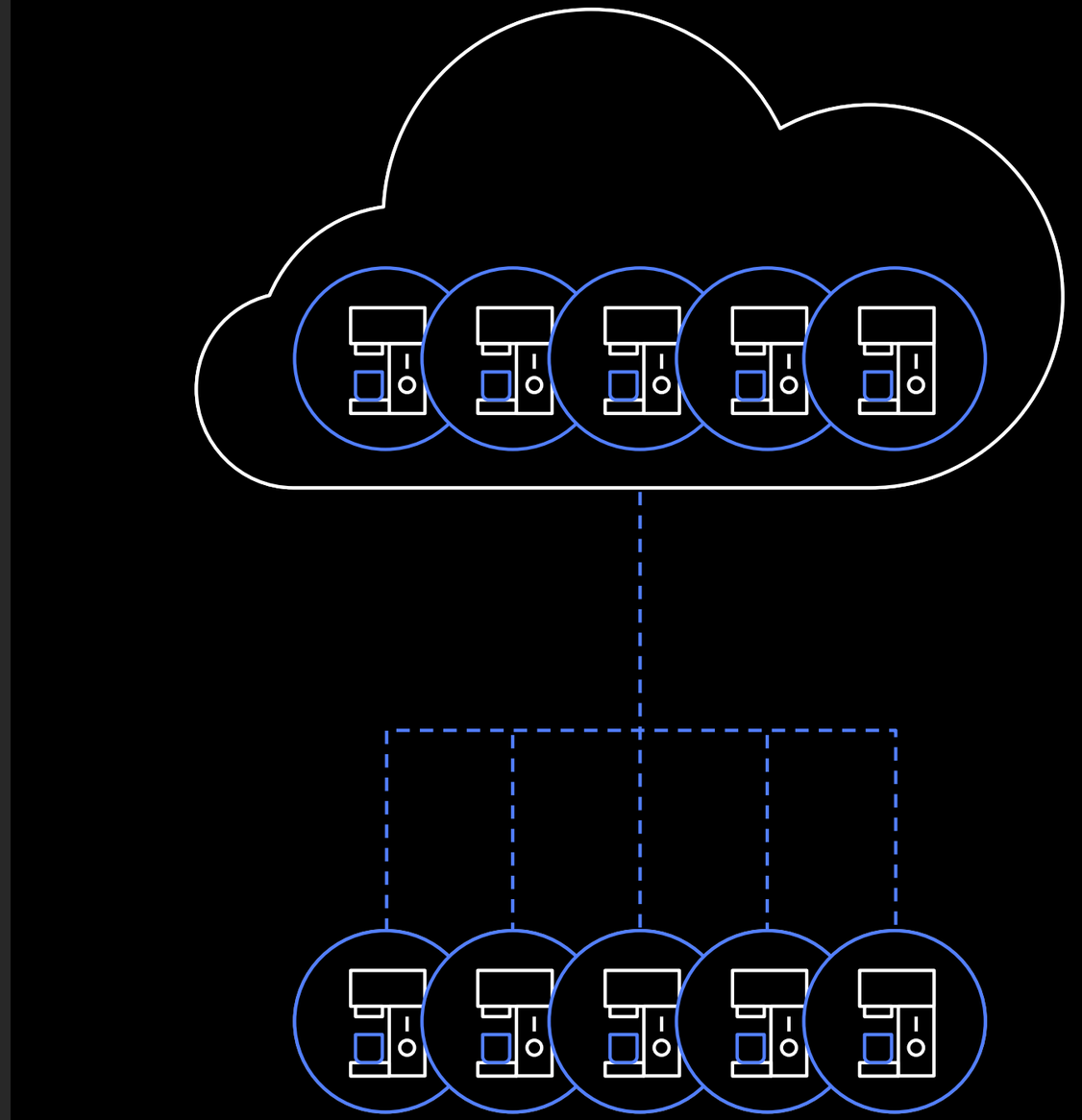
Device shadow

Rules engine

AWS IoT Device Management

AWS IoT Device Defender

How can I automate onboarding large volumes of devices to the cloud?



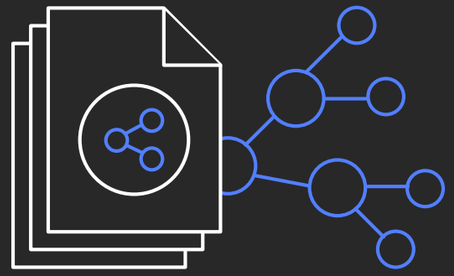


Connectivity
& Control
Services

Fleet Provisioning for AWS IoT Core

Beta Feature!

Automates device- and cloud-side configuration and authentication upon a device's first connection to AWS IoT Core.



Define templates for onboarding, and apply them to all devices for secure provisioning at scale.



Create unique identities to establish trust using the updated AWS IoT Device SDK or the AWS Mobile SDK in branded companion apps.



Automatically provision any number of devices upon first connection to AWS IoT Core.



Connectivity & Control Services

Hunter®

Problem

Hunter Industries' irrigation and landscaping equipment must be provisioned during manufacturing, which requires upfront planning, as developers need to create and apply unique device certificates and policies, before the devices are connected to AWS IoT.

Solution

Fleet Provisioning for AWS IoT Core enables Hunter to automatically attach a common configuration to equipment at the time of manufacturing, and upon first connection to AWS IoT Core, unique device certificates and other required configurations are applied.

Impact

Hunter is able to simplify equipment manufacturing and configuration processes, reduce upfront planning requirements, and increase developer productivity.

"Our device provisioning process involved complex management of device certificates, IoT Things, and Policies to uniquely configure each device at the time of manufacturing.
Now, with AWS IoT Core's Fleet Provisioning feature, we will be able to simplify our device manufacturing and provisioning process. Our generically manufactured devices automatically get their unique device certificates and all other required unique configuration on their first connection to AWS IoT Core."

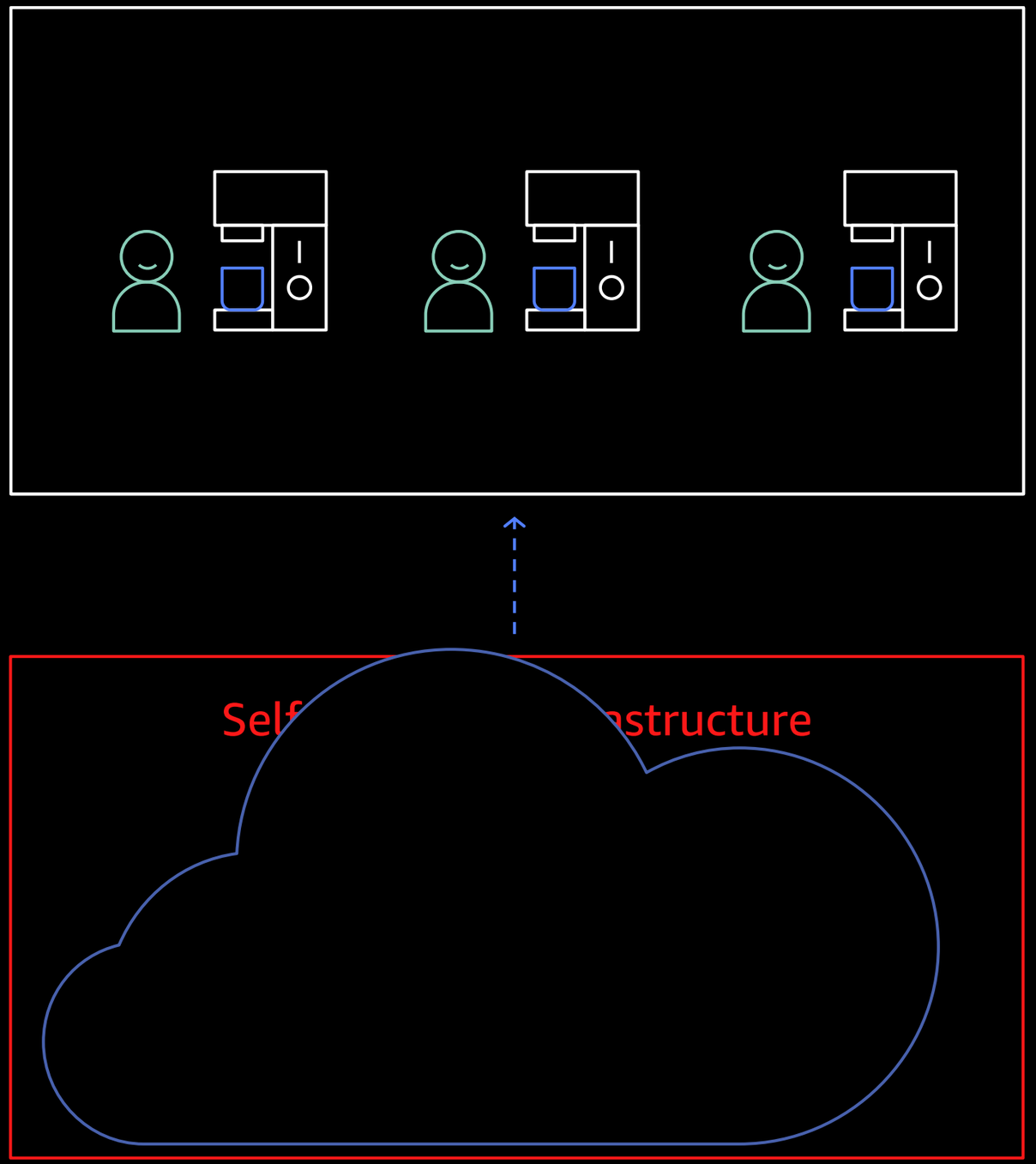
-Chris Lucian
Director of Software Development



How can I easily migrate from an inflexible, self-managed infrastructure to fully managed AWS IoT services?



Connectivity & Control Services



Configurable Endpoints for AWS IoT Core

Beta Feature!

Easily migrate devices to AWS IoT by maintaining different configurations across diverse device fleets with minimal impact on existing devices and applications.

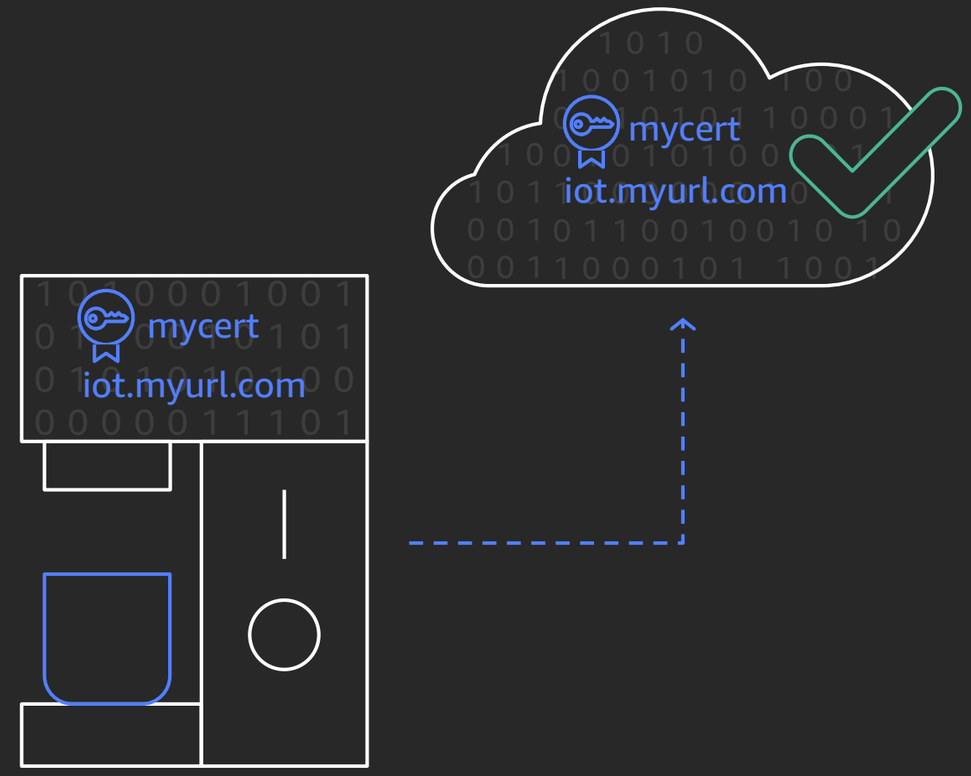
Create multiple IoT endpoints within a single AWS account and set up a unique configuration on each one.

Custom Domains

Continue to use your own domain names and associated server certificates after connecting to AWS IoT Core.

Custom Authorizer for MQTT Connections

Keep your own identity and access management systems for provisioning new device identities.



Connectivity & Control Services

LG Electronics

Problem

LG Electronics connects a wide variety of smart home devices and appliances to AWS IoT Core. Many of these devices are memory constrained and cannot use certificates served through AWS IoT Core endpoints.

Solution

Configurable Endpoints for AWS IoT Core and Custom Domains enable LG to customize their AWS IoT Core endpoint with their own domain name and smaller, custom certificate chain.

Impact

LG Electronics can now connect its memory-constrained devices to its existing applications built on AWS IoT Core, with no modifications to device hardware.



How can I inexpensively add Amazon Alexa to all types of connected devices?

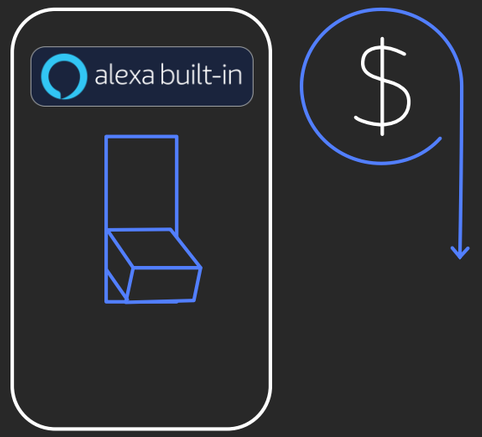


Connectivity
& Control
Services

Alexa Voice Service (AVS) Integration for IoT Core

New Feature!

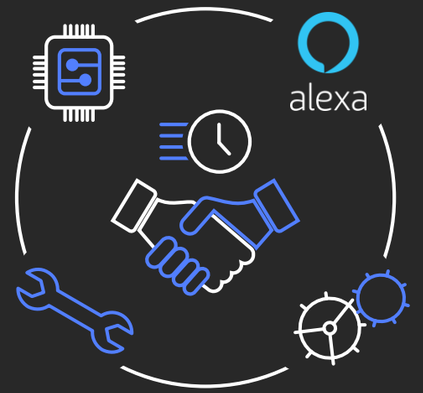
Quickly and cost-effectively go to market with Alexa Built-in capabilities on new categories of products such as light switches, thermostats, and small appliances.



Lowers the cost of integrating Alexa Voice up to 50% by reducing the compute and memory footprint required.



Create new categories of Alexa Built-in products on resource constrained devices (e.g., ARM ‘M' class microcontrollers with <1MB embedded RAM).



Accelerate time to market with certified partner development kits that work with AVS Integration for IoT Core by default.



Connectivity & Control Services

iDevices®

Shawn Monteith

CTO & VP of Engineering



Capabilities & Expertise

iDevices®



Our company's capabilities

IoT Visionaries | iOS/Android | Cloud Development (Own/AWS) | Machine Learning | Artificial Intelligence | Embedded Software | Industrial Design | UI/UX | Hardware Design

Core expertise

Works with Apple HomeKit

WORKS WITH amazon alexa

works with the Google Assistant

Download on the App Store

GET IT ON Google Play

Wi Fi®

Bluetooth®

In-Wall Product Line

Trends In Lighting Technology

Computer Vision

Move Beyond Simple Device Control

ADR—Automated Demand Response

Low-Voltage Lighting



Works with Apple HomeKit

WORKS WITH alexa

works with the Google Assistant

Our Challenges

We’re not a silicon manufacturer/developer

3-year development time

Develop premium product

Focus on: look, feel, sound, and microphone

We needed best-in-class providers

Cut dev time to 4 months (12 months average)

NXP/AWS (AVS Integration for AWS IoT Core)

Scalability and cost of infrastructure

Make vs. buy

Recurring cost (BOM cost)

aws internet of things

NXP

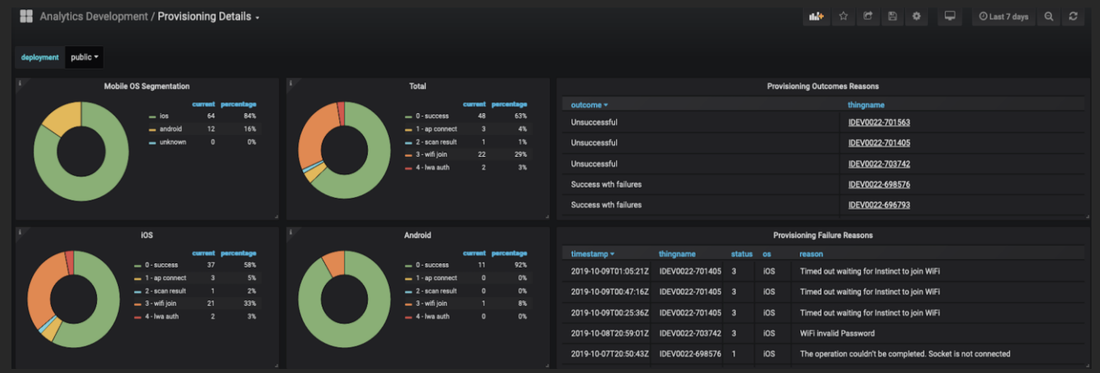
BOM cost connectivity

No Recurring Costs

Performance

Scalability

Analytics



AVS certified hardware that runs on FreeRTOS and connects to AWS IoT Core by default

Turnkey software solution provider

Source code

No additional 3rd-party engagements

MCU resources

RAM: ~300 kB available

CPU: ~240 MHz available (2 mics)

The result: iDevices Instinct

The smart light switch with Alexa Built-in

Instinct reimagines the standard light switch by invisibly integrating Amazon Alexa throughout the home.

Features

Alexa Built-in

Premium SOEN Audio

Dual Microphone Design

Elegant LED Light Ring

Hands-Free Lighting Control

Simple Setup &
Standard Installation

Tech specs

Input: 120VAC,60Hz

Output: 120VAC, 60Hz

CFL/LED:150W

Incandescent/Halogen:150W

By using AWS IoT, iDevices accelerated time-to-market and optimized infrastructure costs.



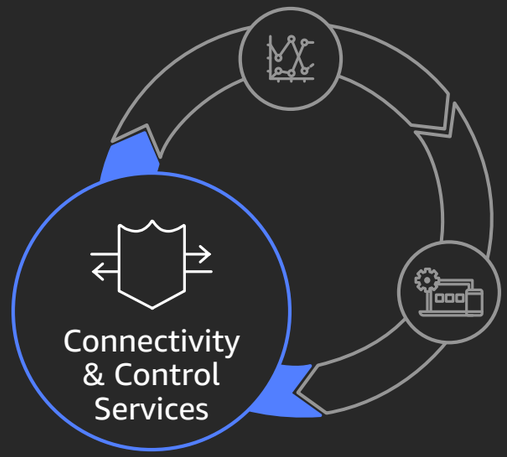
“The addition of built-in Alexa support and sensors that can switch the light on and off whenever motion or ambient light are detected are both nice steps forward for the iDevices brand, and enough for the Instinct to call itself one of the most advanced big-name smart switches on the market.”

c|net

Thank You!



How can I manage my growing number of connected devices and keep my fleet healthy?



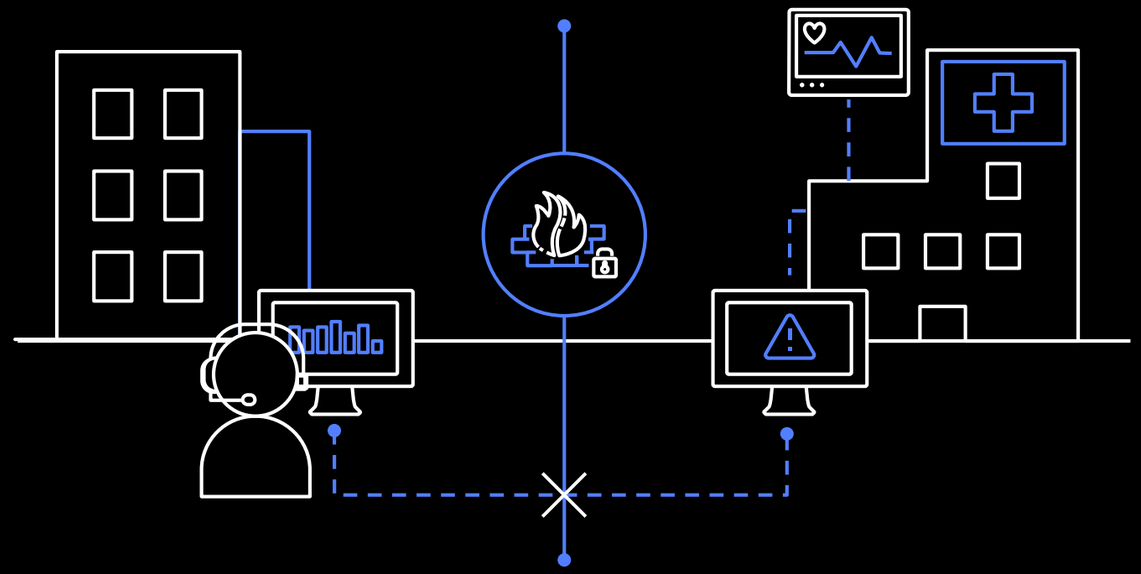
AWS IoT Core

AWS IoT Device Management

Bulk registration
Fleet indexing and search
Fine-grained device logging
Device jobs

AWS IoT Device Defender

How can I remotely diagnose and troubleshoot devices on VPCs or behind firewalls?



Connectivity
& Control
Services

Secure Tunneling for AWS IoT Device Management

New Feature!

Provides secure connectivity to individual devices in just a few clicks to diagnose issues and take action to solve them.



Gain remote access to devices on isolated networks or behind firewalls.



Establish trusted connections that adhere to customers' corporate security policies.



Troubleshoot and solve device issues more quickly and cost-effectively, with no disruption to end user experience.



Connectivity & Control Services

ThermoFisher
SCIENTIFIC

Problem

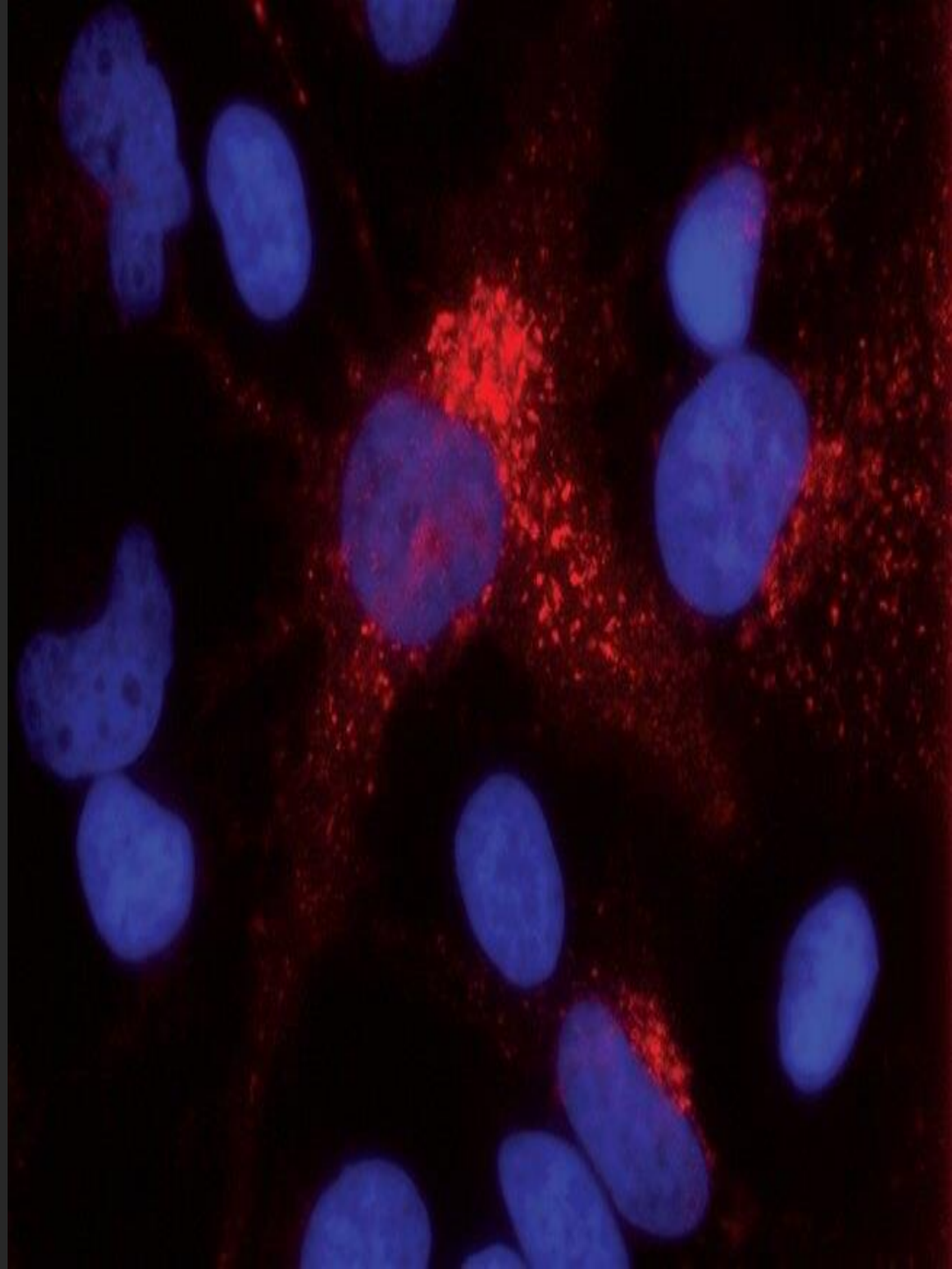
Thermo Fisher Scientific needed a single solution across its connected portfolio of smart medical equipment products to remotely diagnose and potentially repair instruments in the field.

Solution

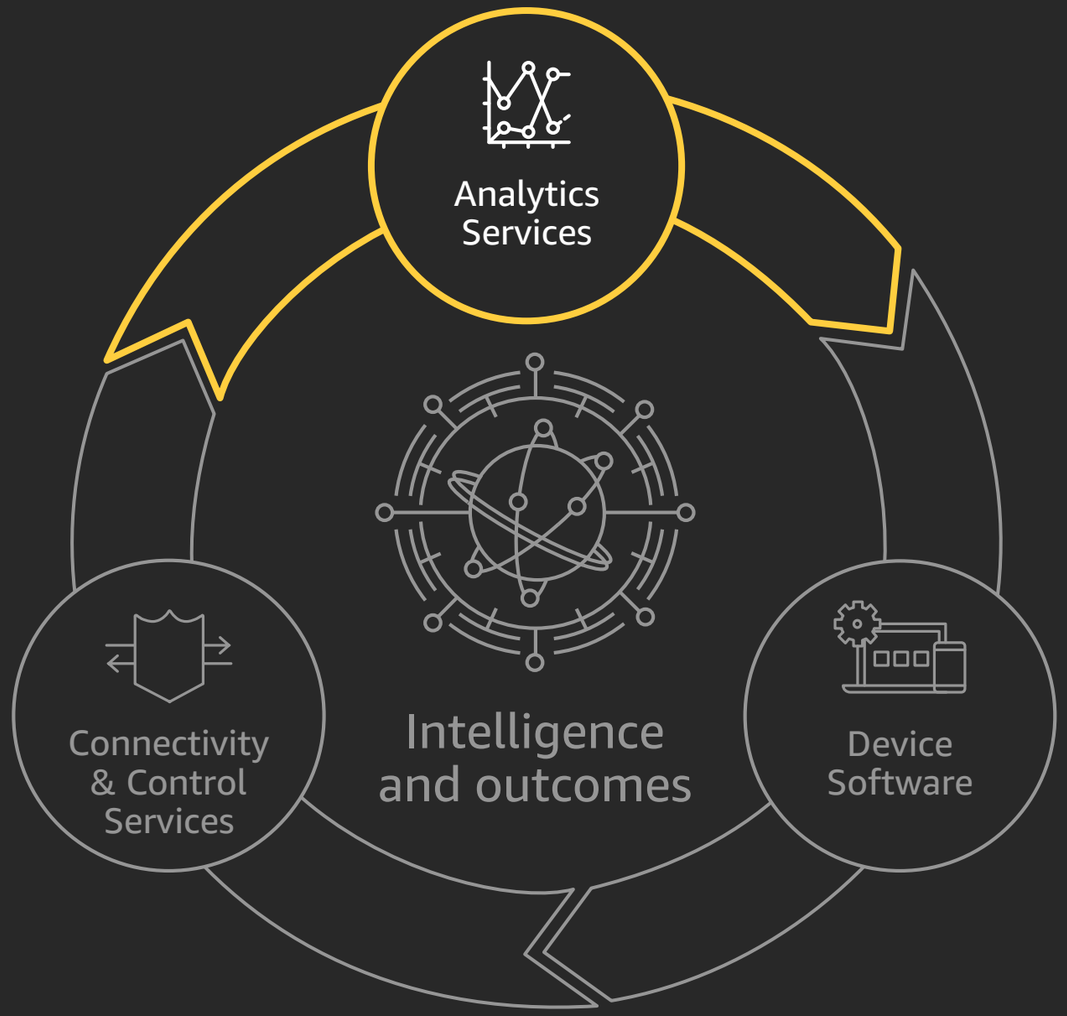
Secure Tunneling will provide a unified solution to troubleshoot the company's devices while enabling it to use a variety of tools such as Remote Desktop, SSH and file transfer.

Impact

Using Secure Tunneling will enable Thermo Fisher Scientific to resolve service issues more quickly and lower costs by eliminating the need for an onsite field service engineer visit.



How can I make sense of my IoT data and take actions to solve business problems?



How can I make sense of my IoT data and take actions to solve business problems?



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

How do I extract value from my IoT data?

How can I detect changes across complex IoT systems?

How can I build IoT applications faster?

How can I make sense of my IoT data and take actions to solve business problems?



AWS IoT SiteWise (Preview)

Collects data from the plant floor, structures and labels that data, and generates real-time KPIs and metrics (e.g., OEE) to make better data-driven decisions.

AWS IoT Analytics

Makes it easy to run and operationalize sophisticated analytics on massive volumes of IoT data.

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.

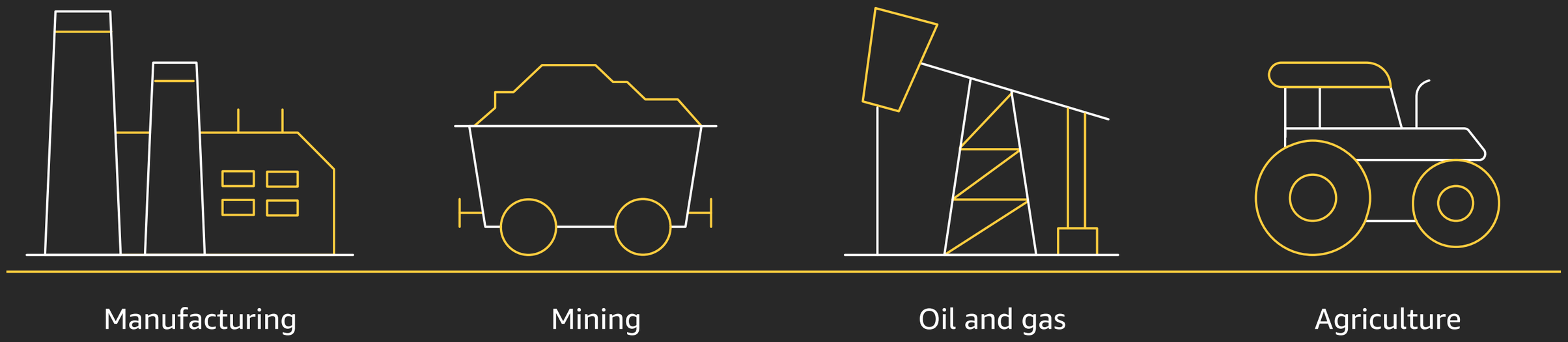
AWS IoT Things Graph

Helps you rapidly build IoT applications by combining devices and web services and defining the interactions between them with little to no code.

IoT transforms traditional industrial processes

Most data collected on premises is never analyzed and is thrown away.





Manufacturing

Mining

Oil and gas

Agriculture

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



AWS IoT SiteWise (Preview)

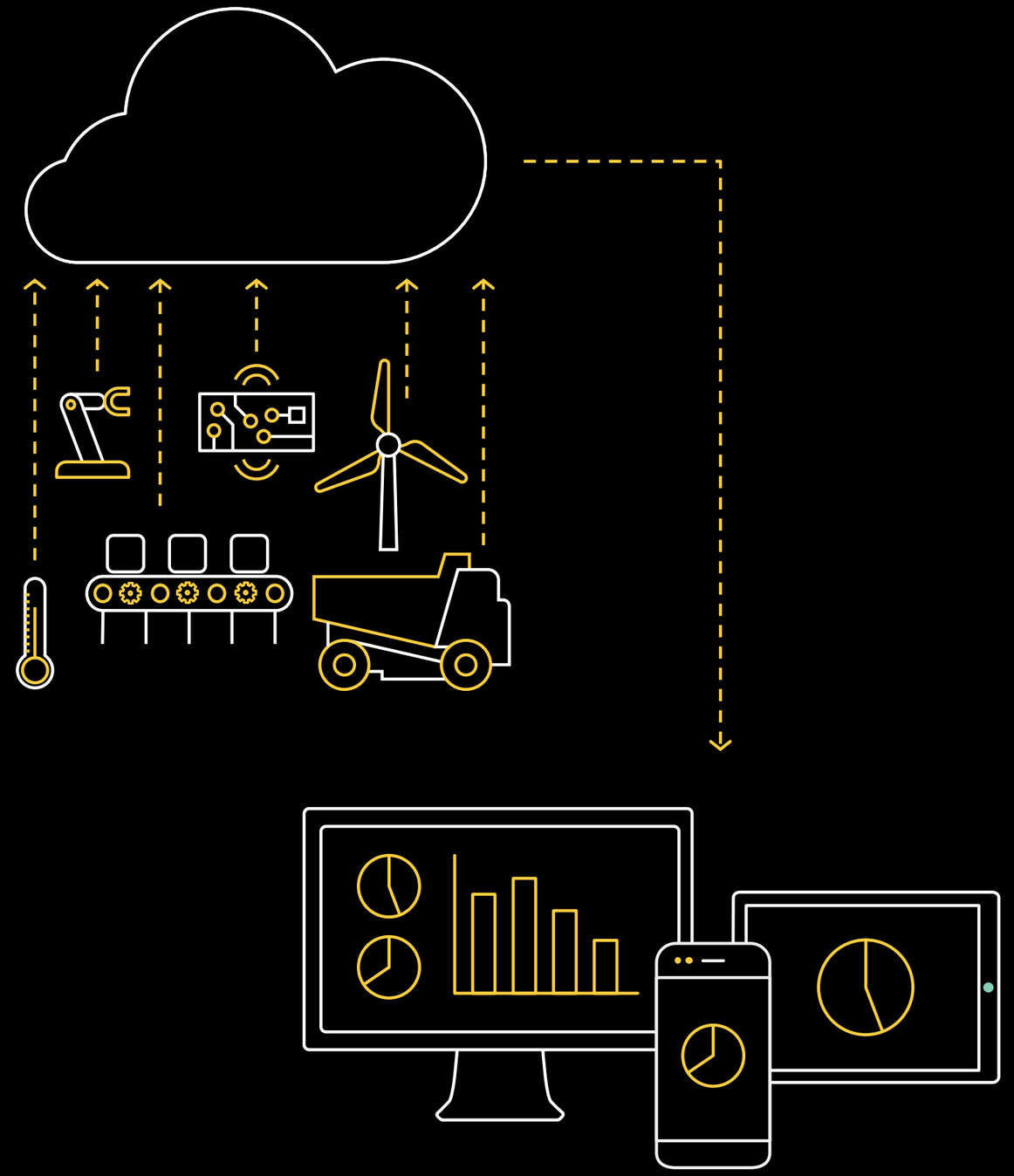
Ingest
Model
Store
Process

AWS IoT Analytics

AWS IoT Events

AWS IoT Things Graph

How can anyone in my organization quickly get insight into operational data?



Analytics
Services

SiteWise Monitor for AWS IoT SiteWise (Preview)

Beta Feature!

Create a fully managed web application for visualizing and interacting with operational data from devices and equipment connected to AWS IoT.



Set up and deploy web applications for visibility into industrial machine data in minutes, without writing any code.



Automatically discover and visualize data from industrial assets that have already been ingested and modeled with AWS IoT SiteWise.



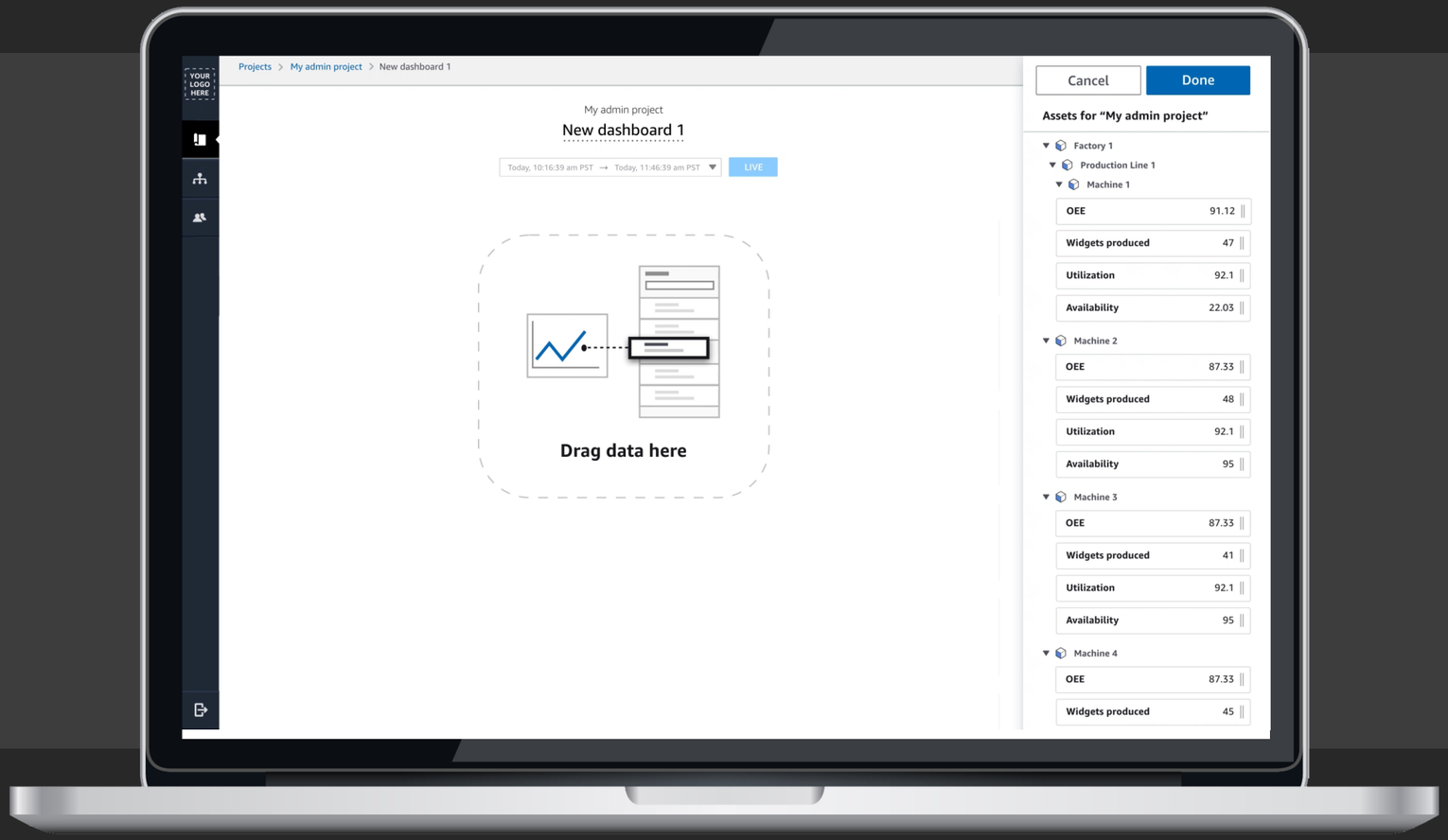
Easily share access to industrial data with any team in your organization to accelerate insights.

Analytics Services

SiteWise Monitor

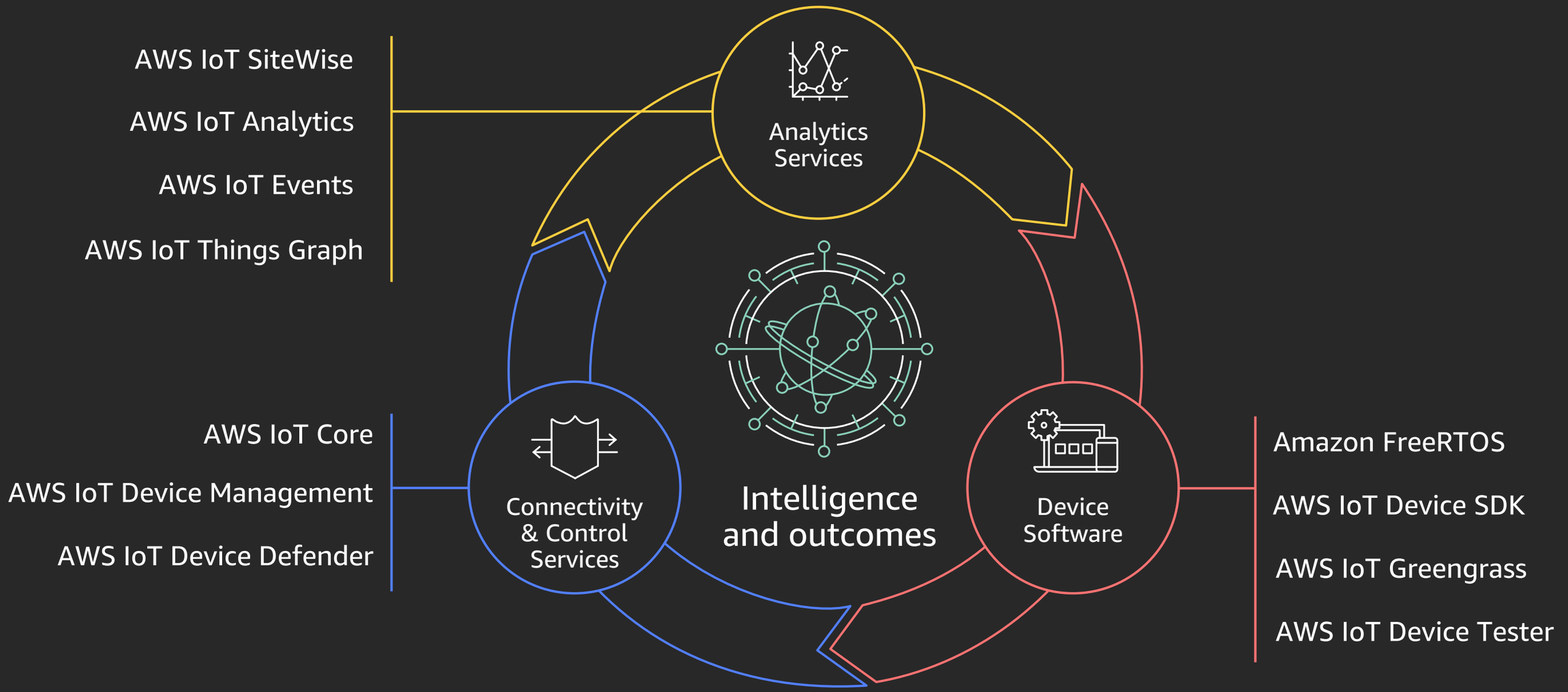
Beta Feature!

Create a fully managed web application for visualizing and interacting with operational data from devices and equipment connected to AWS IoT.



Analytics Services

IoT virtuous cycle



DIGITAL
PRODUCTION
PLATFORM

VOLKSWAGEN
GROUP

aws

Frank Göller

Head of Digital Production,
Volkswagen Group

3 Scenarios







To understand the future, we need to understand the past

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Traditional → Intermediate → Revolutionary





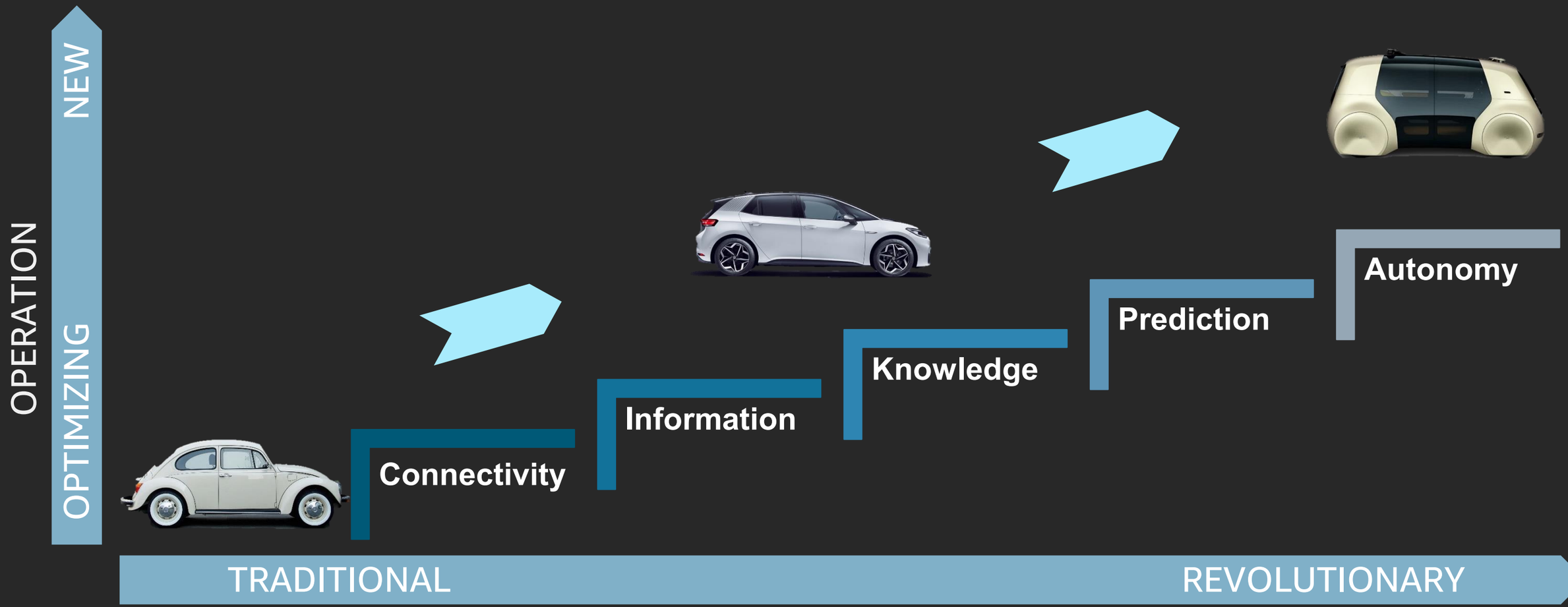


Data-eco-system platform based

The transformation changes the way in which Production and Logistics are operated

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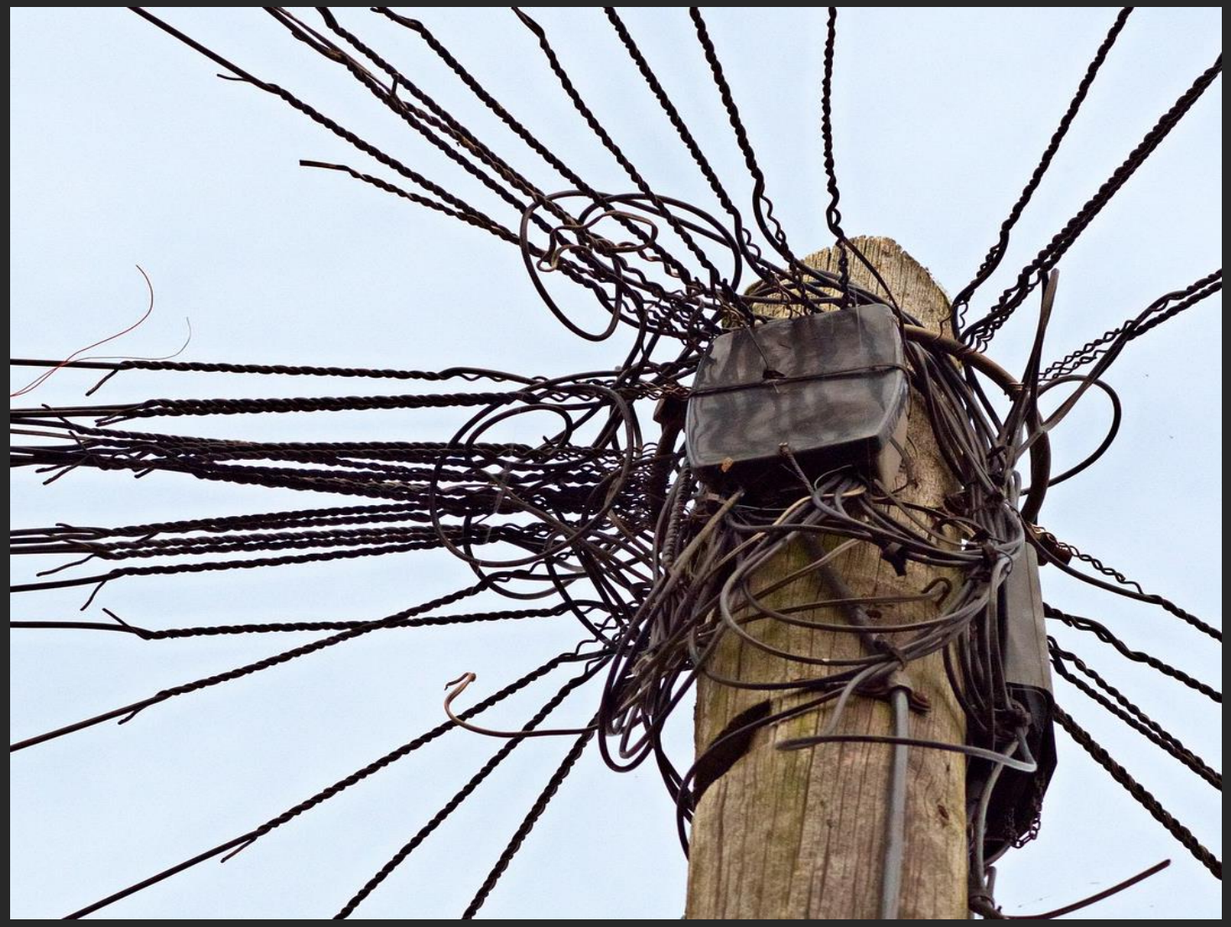


Point-to-point connections for electrification of car functions

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Paradigm shift to an integrated modular platform

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Principles

Culture

Technology

Digital Production Platform as a layer between shop floor and application

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Volkswagen Group App Store
Applications for Use Cases



Digital Production Platform

aws | VOLKSWAGEN GROUP

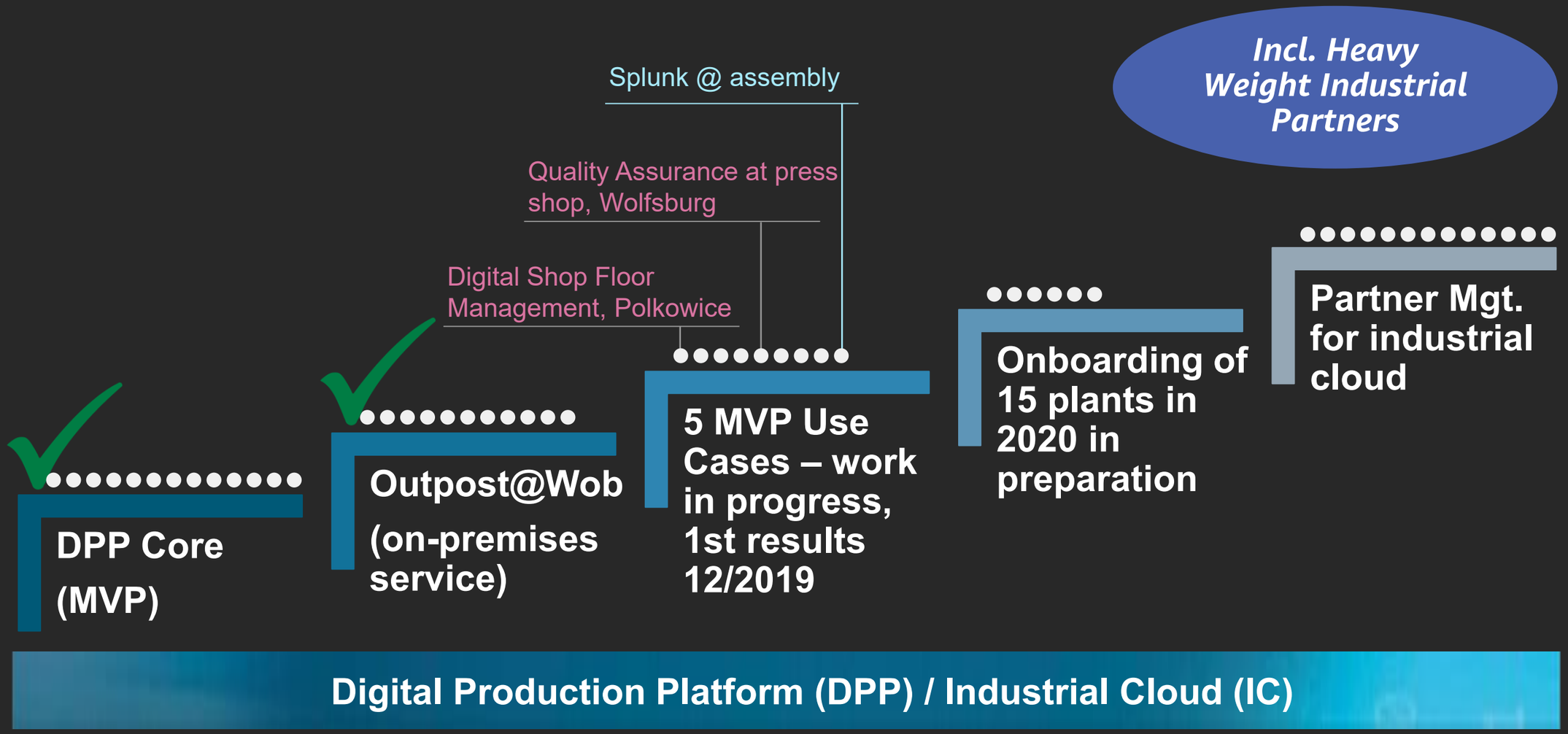
- Artificial Intelligence and Analytics
- Cloud & Integration
- Security, Data Management

Machinery and Facilities

- Material Logistics
- Press shop
- Body shop
- Paint shop
- Assembly
- Car Logistics

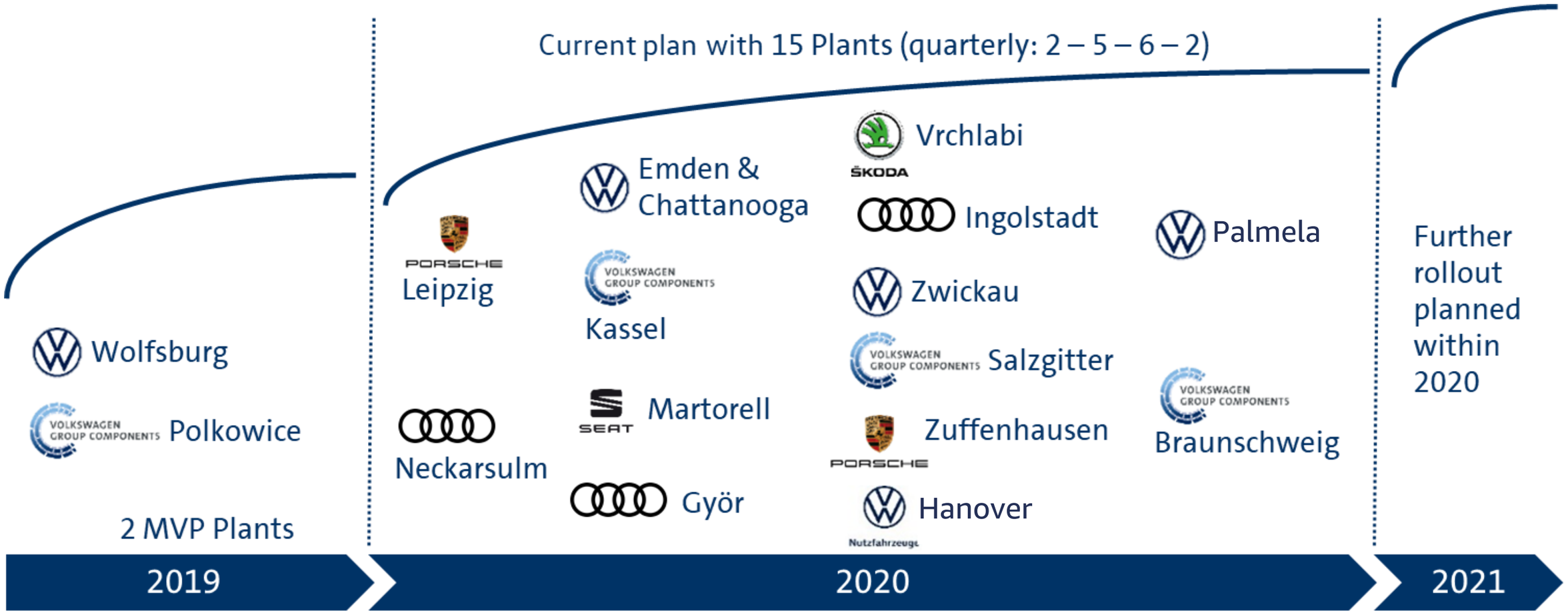
DPP Current Status

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DPP Plant Onboarding Plan

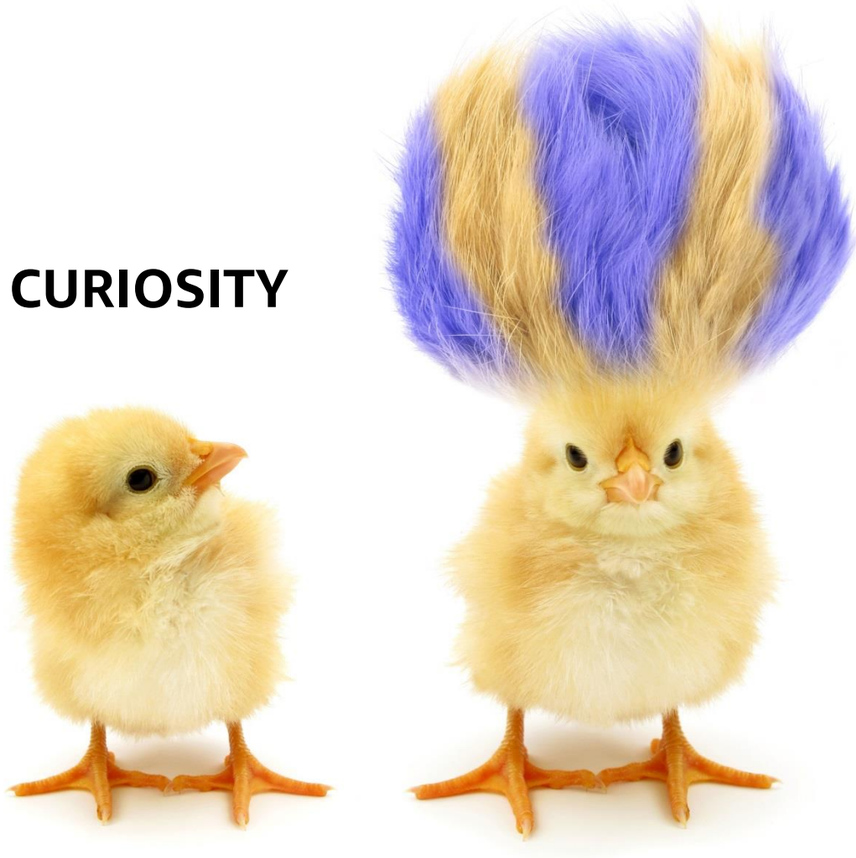
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What are we headed for?

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HEAD OF CURIOSITY



HEAD OF OPENNESS

Success Factors along 3 dimensions

Technology



Principles



Culture



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PLATFORM

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Thank you!







How do I quickly build a solution customized to my business needs?

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Achieve business outcomes faster using solutions built by AWS and our APN Partners



AWS IoT Solutions

Help you quickly solve problems across common industry use cases.

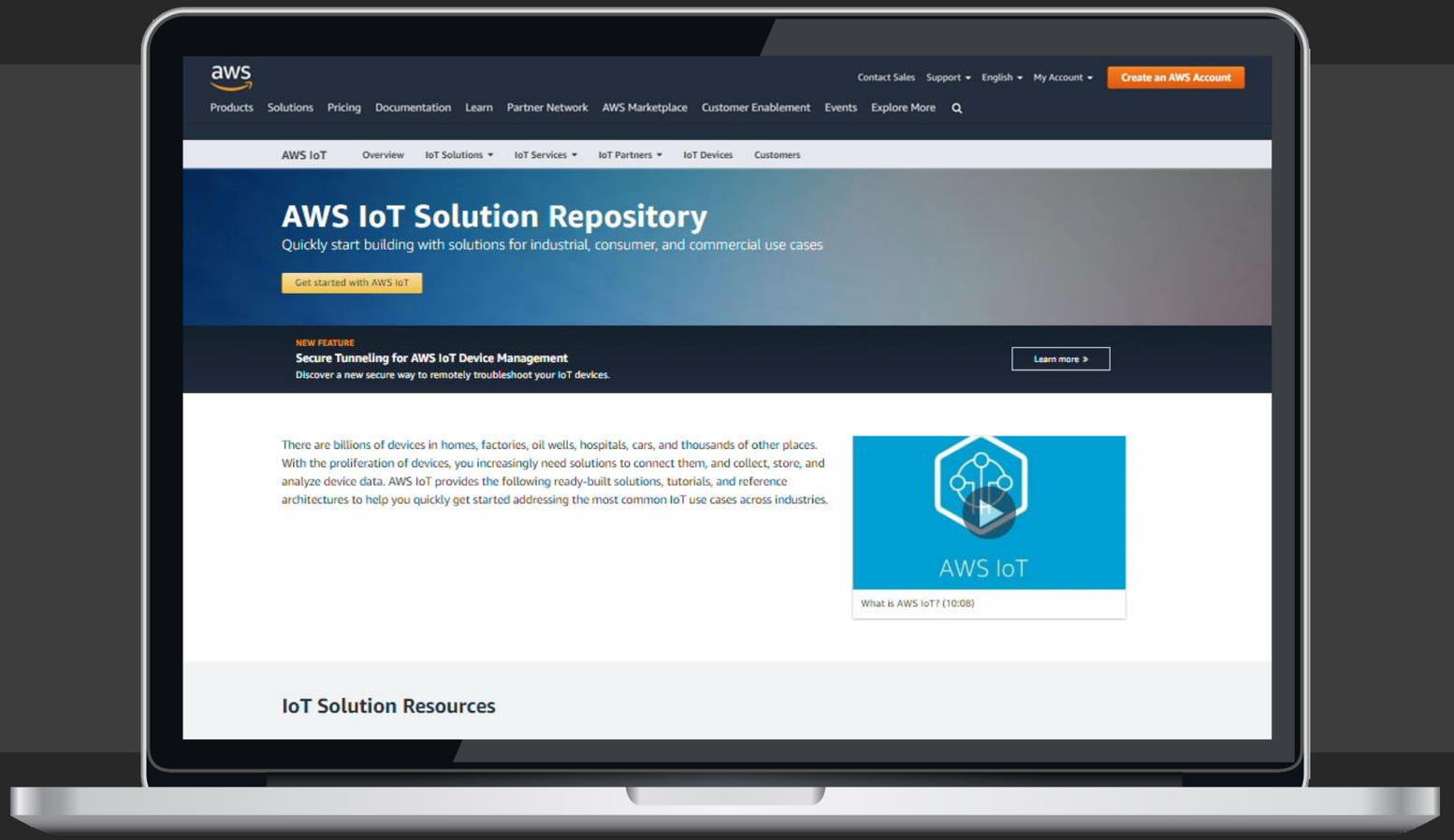


APN Solutions

Accelerate your time to value leveraging the expertise of APN Partners and their pre-built solutions.

AWS IoT Solutions

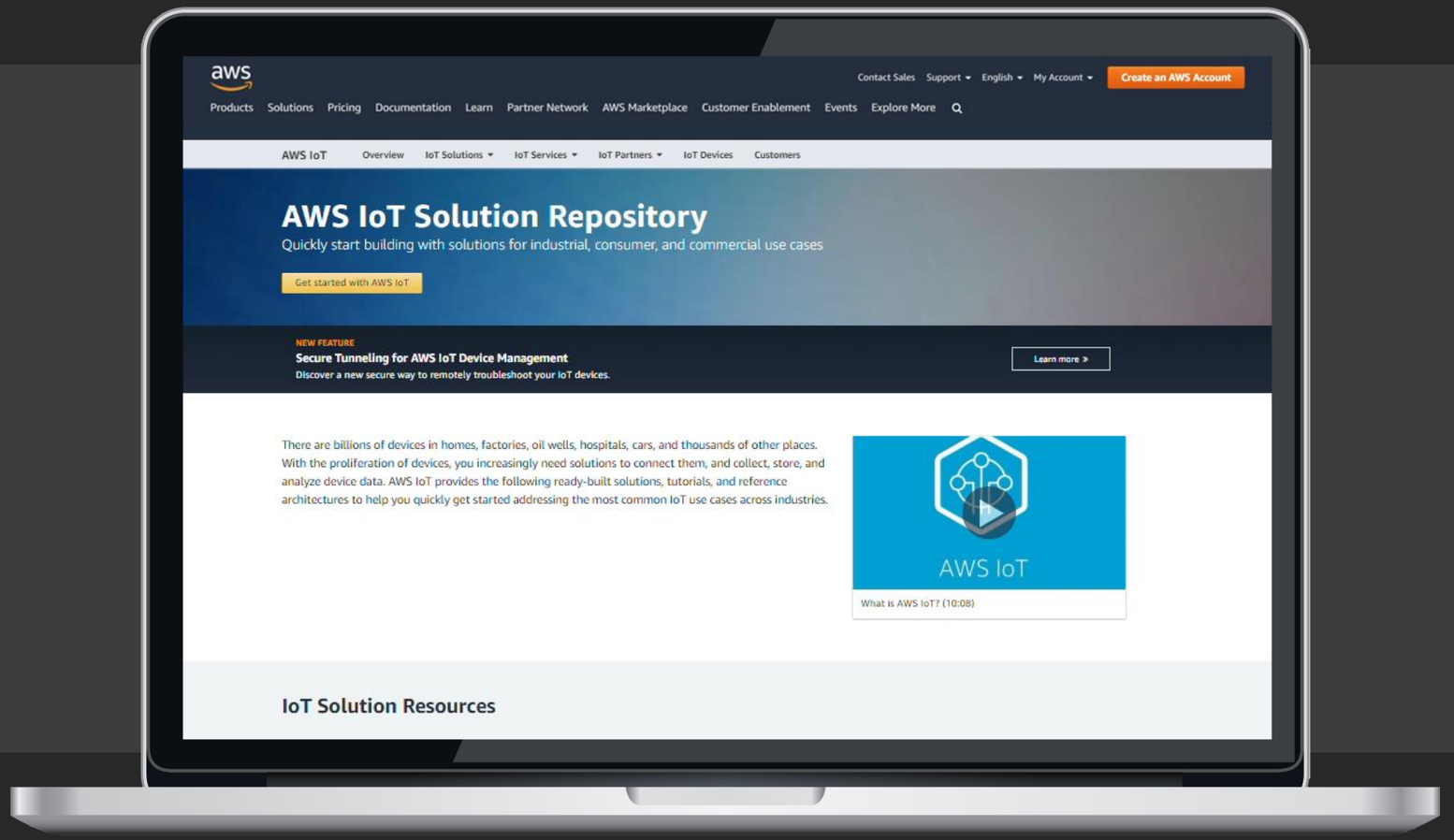
Build faster with AWS CloudFormation templates, deployment guides, GitHub repositories, reference architectures, and more.



aws.amazon.com/iot/solutions

AWS IoT Solutions

Build faster with AWS CloudFormation templates, deployment guides, GitHub repositories, reference architectures, and more.



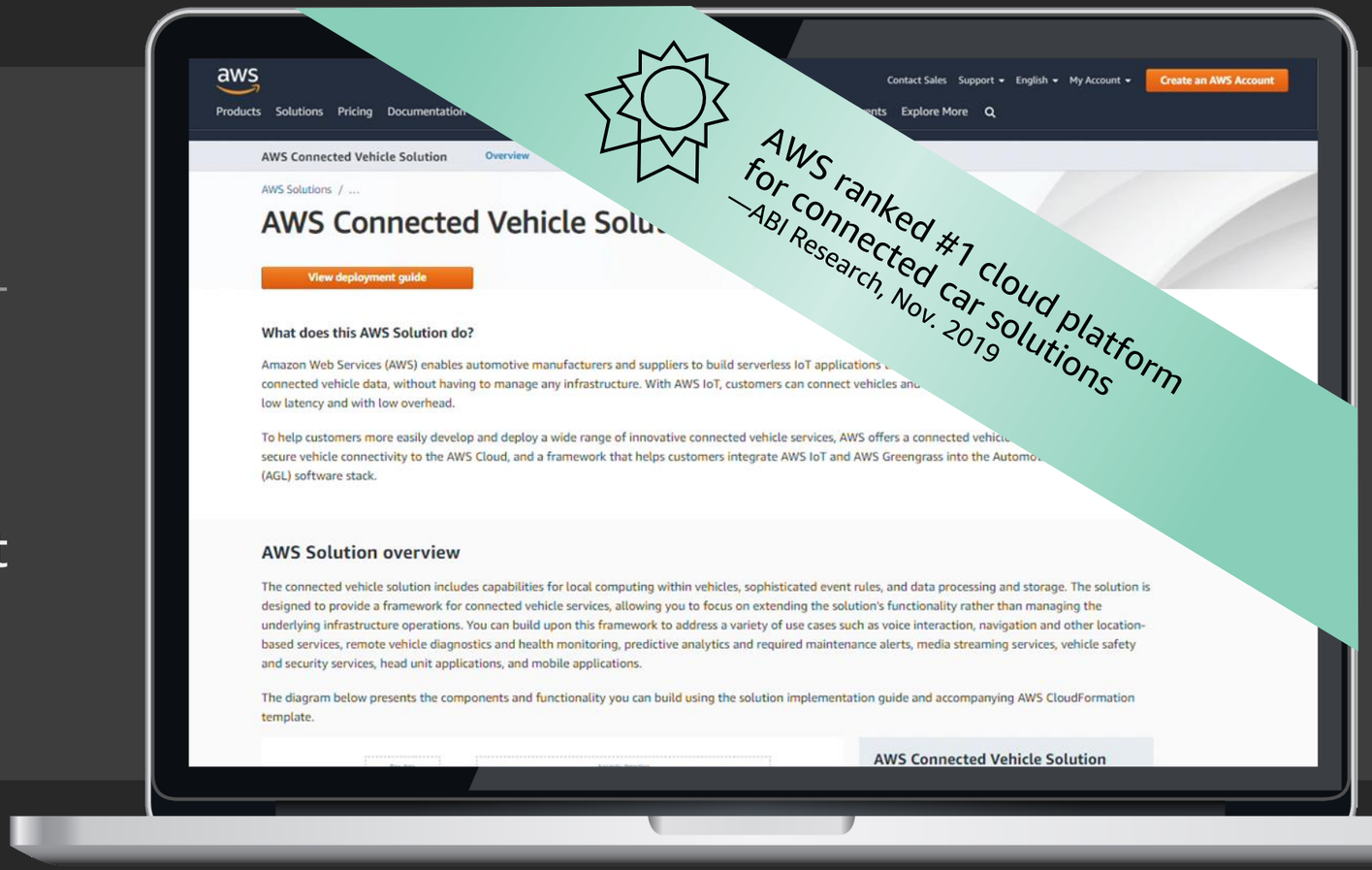
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AWS IoT Solutions

Build faster with AWS CloudFormation templates, deployment guides, GitHub repositories, reference architectures, and more.

Connected Vehicle Solution

Enables automotive manufacturers and suppliers to build serverless IoT applications that gather, process, analyze, and act on connected vehicle data, without having to manage any infrastructure.



AWS ranked #1 cloud platform for connected car solutions
—ABI Research, Nov. 2019

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AWS IoT Solutions

Build faster with AWS CloudFormation templates, deployment guides, GitHub repositories, reference architectures, and more.

Connected Home Solutions

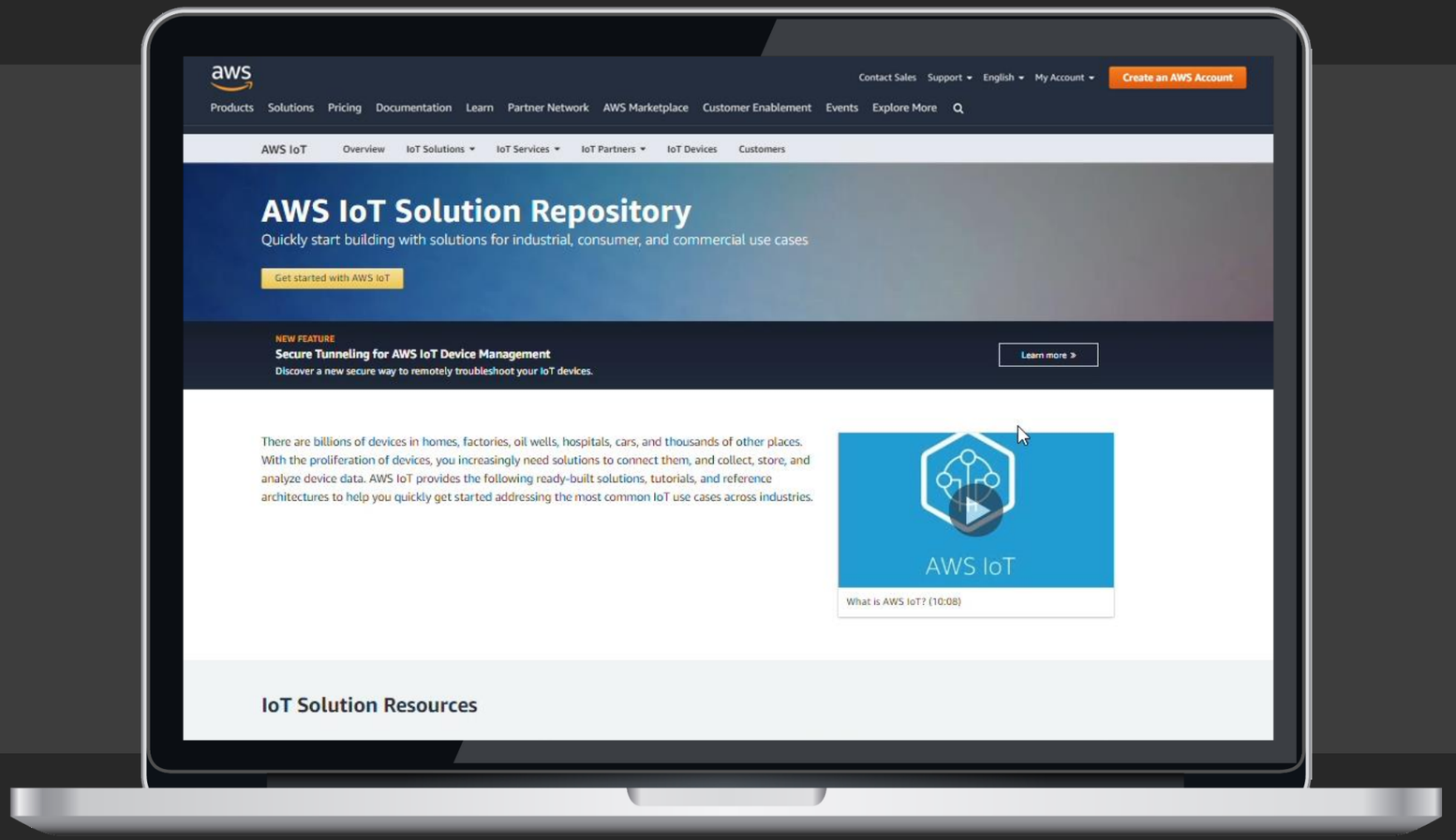
Enables connected home device manufacturers to easily, quickly, and securely build differentiated connected home products at scale.



aws.amazon.com/iot/solutions/connected-home

AWS IoT Partner Solutions

Accelerate your time to value with pre-built, end-to-end solutions built by APN Partners.



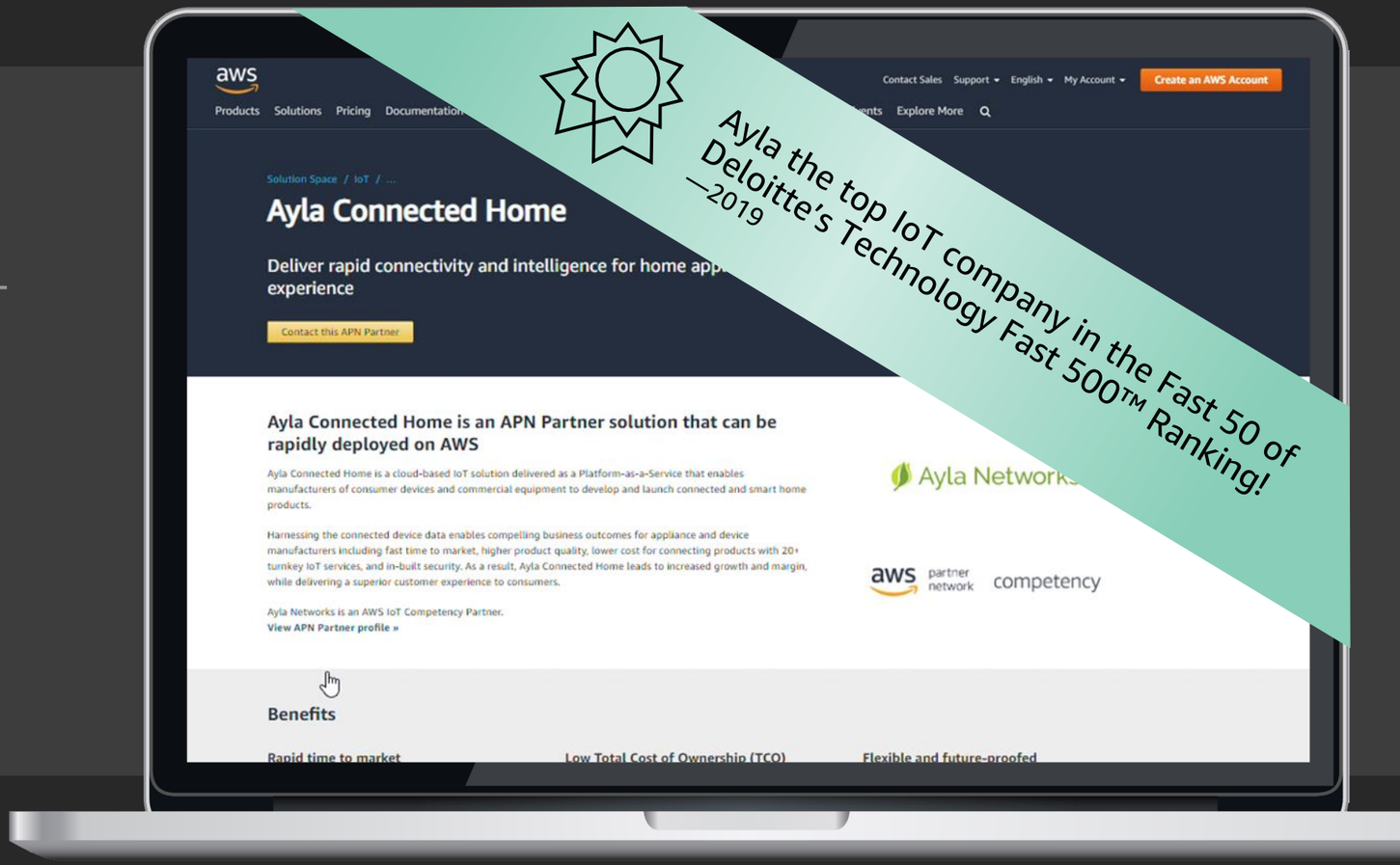
aws.amazon.com/iot/solutions

AWS IoT Partner Solutions

Accelerate your time to value with pre-built, end-to-end solutions built by APN Partners.

Connected Home Solution

A platform-as-a-service that enables manufacturers of consumer devices and commercial equipment to develop and launch connected and smart home products.



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How do I find the right partner to help me build a solution for my business?

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AWS IoT Partner Network

Delivering use case specific applications and solutions

Solutions and Outcomes

Global Systems Integrators

accenture, TCS, wipro, Cognizant, TensorIoT, HCL, slalom, Persistent, Tech Mahindra, TATA Consultancy Services, Deloitte., Infosys

Regional Systems Integrators

slalom, VOSTOK, tuya, LUXOFT, Crayon, FUJISOFT, eCloudValley, mobiquity, trek10, ONICA, splunk>, KOLON BENIT, clearscale, OBLIVION Cloud Control, solstice, vertex, Atos, UPTAKE

Independent Software Vendors

SAP, ThingLogix, HITACHI Inspire the Next, 47 Lining, BSQUARE, Ayla Networks, devicepilot, infor, modjoul, DOMO, machineshop, Bright Wolf, ptc

Connectivity

Gateway

technicolor, LOGIC, ADLINK, Laird Technologies, DELL EMC, ADVANTECH, SIERRA WIRELESS, OPTO 22, Lenovo, FOGHORN, kepware

Network/Carrier

twilio, Ayla Networks, verizon, QUECTEL, SORACOM, mnubo, at&t, ASAVIE, eseye, amdocs, EMnify

Edge

Silicon

NXP, ST, SILICON LABS, intel, Infineon, Qualcomm, nuvoTon, MARVELL, MICROCHIP, RENESAS, XILINX, ESPRESSIF, NVIDIA, NORDIC SEMICONDUCTOR, MEDIATEK, CYPRESS, REALTEK, Texas Instruments

OEM/ODM/CM

SIEMENS, Hewlett Packard Enterprise, CloudRAIL, RIGADO, machineshop, GE, LOGIC SUPPLY, libelium, DIGI, rexroth A Bosch Company, lenovo, BOSCH, muRata, acer, Shoreline IoT, Laird Technologies, Celestica, JABIL, FOXCONN, SERCOM

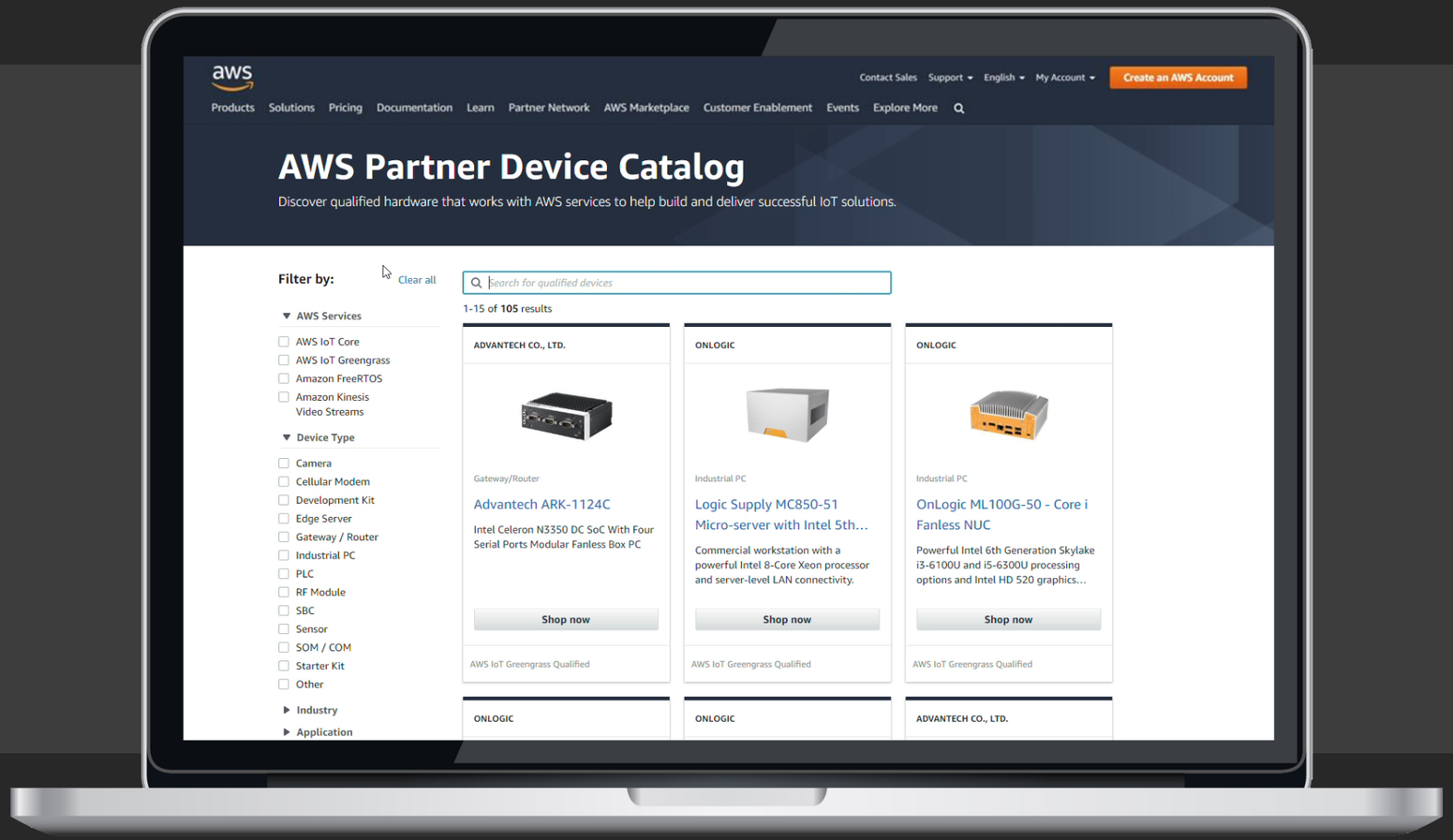
aws.amazon.com/iot/partner-solutions/

How do I find the right device that works with AWS IoT?

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AWS Partner Device Catalog

Discover validated Partner hardware and devices that are qualified to work with AWS by default.



340+

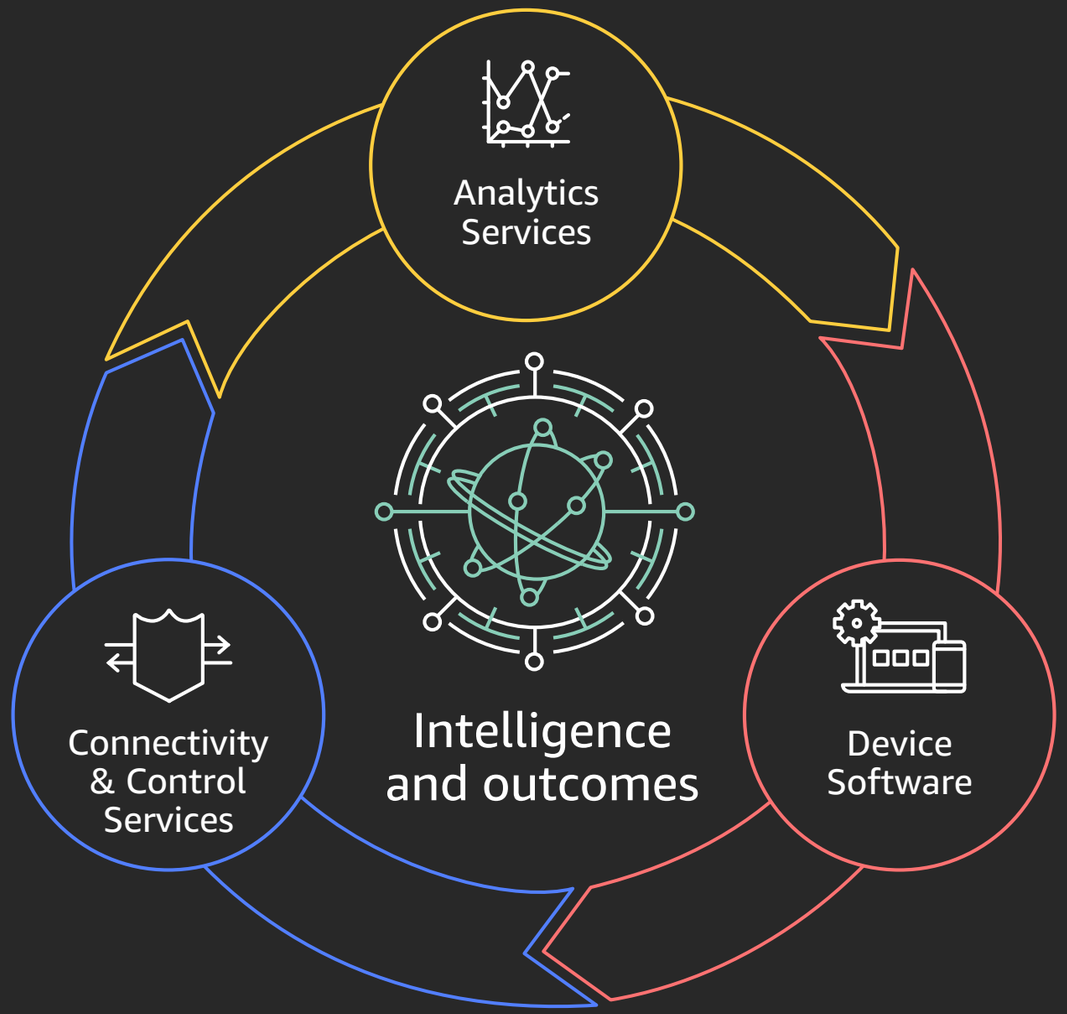
Qualified IoT devices in the Partner Device Catalog.

https://devices.amazonaws.com/

Why AWS IoT?

Broadest and deepest functionality	From the edge to the cloud, build IoT applications for virtually any use case across a range of devices and benefit from integration with Amazon Alexa and AWS services (e.g., Machine Learning).
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 hundreds of millions of different devices and billions of messages.
Solutions to help you realize business outcomes faster	Accelerate your time to value with pre-built solutions for virtually any use case built by AWS and our APN Partners.

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!

AWS re:Invent

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