**IOT201**

# Unlocking innovation: Differentiate your product with new IoT features

Shyam Krishnamoorthy (he/him)

GM, Consumer IoT and Connectivity
AWS

Boaz Brudner (he/him)

Head of SaaS Engineering, AI
and Architecture
Innovyze at Autodesk

Eric Shulze (he/him)

VP of Product Management
Trend Micro

# Agenda

## Delighting customers with innovation and differentiation

- What drives customer delight? (With examples!)
- What challenges make it hard?
- How do you overcome these challenges?

## Creating customer delight with differentiation

- Autodesk
- Trend Micro
- PayTM

## New AWS IoT features to accelerate your innovation journey

## Putting it all together – Your pathway to success

"Inventions have long since reached their limit, and I see no hope for further development."
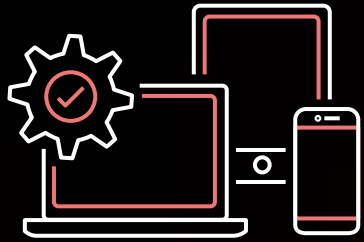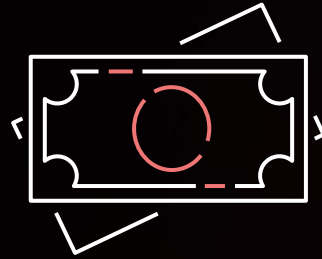
**Julius Fortinus**

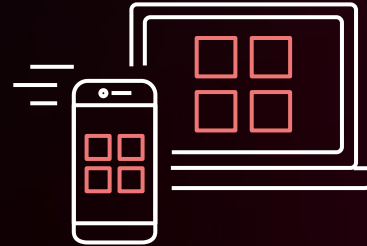Roman engineer and author

~2000 years ago

# Durable truths about customer delight

Easy to use –
"it just works"

Saves me money

Improves quality of life
using smart data insights

Adapts to my
evolving needs

**Delighting** customers through **innovation** and **differentiation** builds customer **trust**

Delivering purely **functional elements** creates business risk

**rachio**

**Challenge**: Building security and connectivity into a Smart Sprinkler hardware, while ensuring scalability

**Outcome**:

- Offloaded the functional tasks to AWS IoT
- Unlocked 40% development cost savings
- Fully managed with high availability and scalability

# Delivering differentiated customer experiences

**WYZE**

Created **differentiated value** for their customers with unique features such as people detection for cameras.

**50%** reduction in time to market

**easee**

Deployed an **innovative** smart electric vehicle charging robot **with high reliability,** building customer **trust**.

**25%** development cost savings

**BISSELL®**

Made cleaning easier for homes, providing customers capabilities such as **custom cleaning zones**.

**50%** improvement in API response time
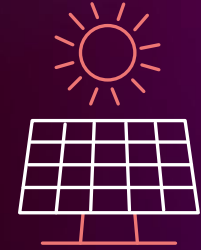
# Where customers are creating differentiation

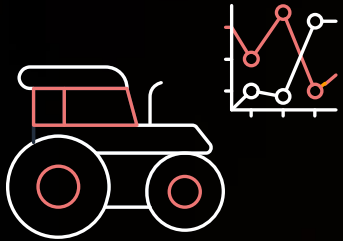**Building smarter products and user experiences in homes, buildings, and cities**

**Building connected healthcare and wellness applications**

**Improving safety, productivity, and engagement in connected campuses**
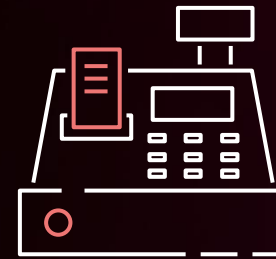
**Managing energy resources (connected batteries, solar panels, and more)**

**Growing healthier crops with greater efficiencies**

**Transforming transportation with connected and autonomous vehicles**

**Improving shopper experience and optimize stocking programs in retail**

**Streamlining food planning in quick-service restaurants**

# Differentiating through connected IoT products

**Customer Experience**
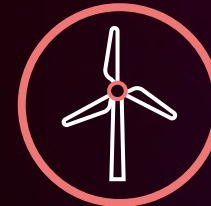
Use IoT data to improve customer experience

**Increase Revenue**

Unlock new sources of revenue

**Save OpEx**

Improve operational efficiencies

**Accelerate Innovation**

Increase your business velocity

# But, there are challenges that can limit differentiation focus

End to End Security Considerations
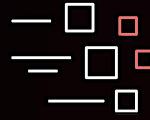
| Design | Manufacturing | Edge processing |
|---|---|---|

| Connectivity and Registration | Collection and processing of data | Analysis |
|---|---|---|

| Unlocking Insights | Management & Advisory | Efficiencies at scale |
|---|---|---|

Building IoT enabled hardware is challenging and costly

**Takes years of development time and competencies**

Unlocking value from data

**How to securely handle large volumes of data?**

Managing efficiencies at scale

**Difficulties in maintaining reliability at scale**

# Overcoming challenges from edge to cloud

| Design | Manufacturing | Edge processing |
|--------|--------------|-----------------|

| Connectivity and Registration | Collection and processing of data | Analysis |
|---|---|---|

| Unlocking Insights | Management & Advisory | Efficiencies at scale |
|---|---|---|

How to **accelerate development**
of IoT-enabled connected products?

# Options to build IoT hardware that works with AWS IoT



**Microcontrollers**

freeRTOS

**and**

**C SDK**

**Microprocessors**

AWS IoT Greengrass

**IoT device**

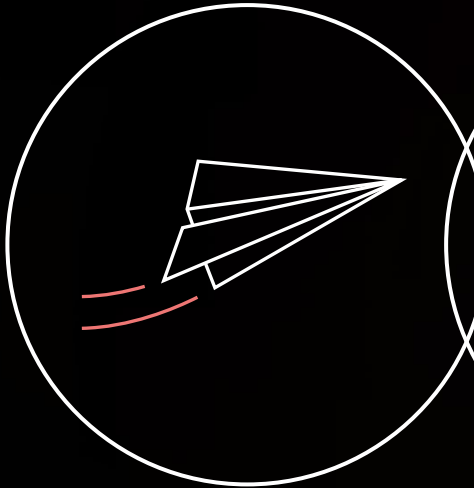AWS IoT Device SDK
**or**
AWS IoT Device Client

**Wireless module**

IoT ExpressLink

aws internet of things
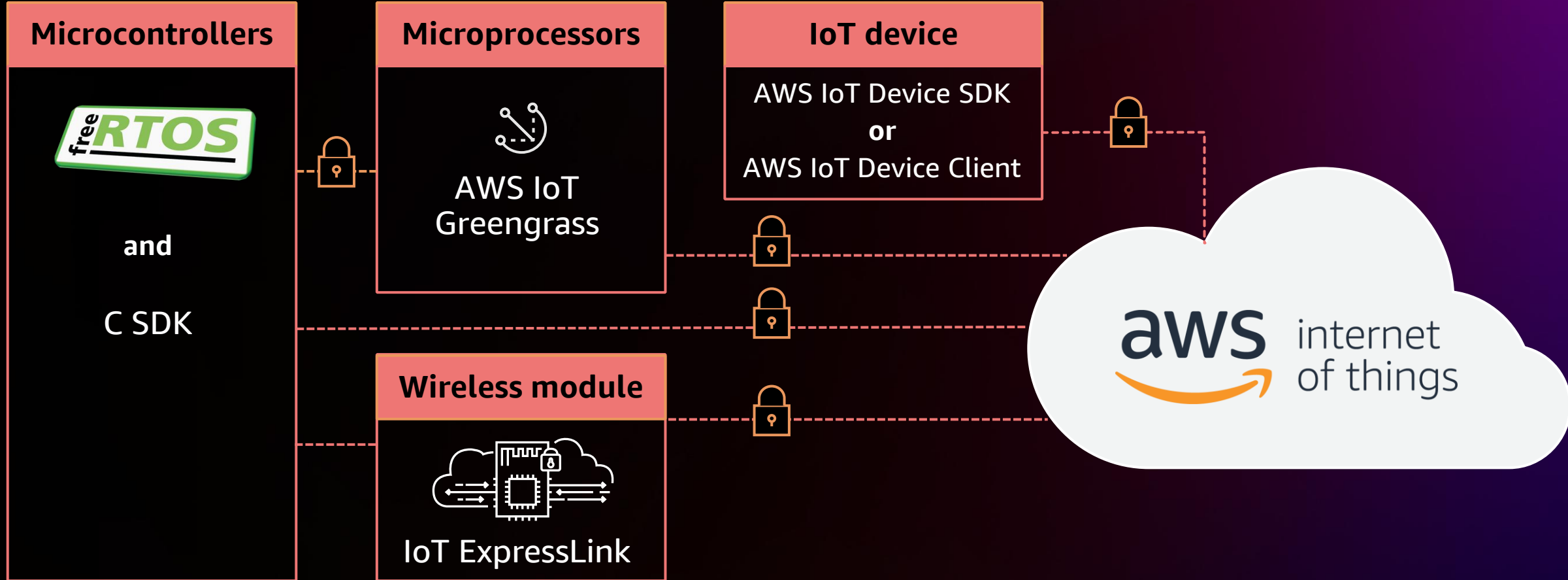
# Enable hardware connectivity using AWS IoT ExpressLink

AWS IoT ExpressLink connectivity modules include software implementing AWS-mandated security requirements, making it faster and easier for you to securely connect devices to the cloud.

## Quick

Offload the complex networking and cryptography tasks to the module
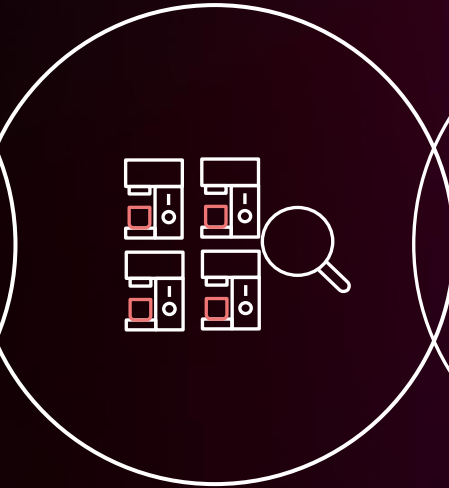
## Easy

Modules are preprogrammed to seamlessly integrate with over 200 AWS services
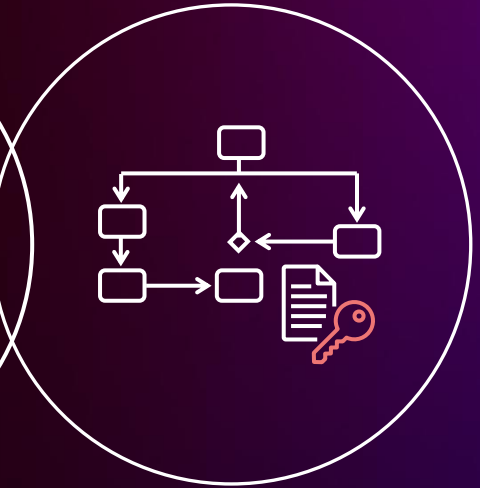
## Secure

Features leading security software to help protect devices from remote attacks

## Manage fleet security and health at scale

Remotely deploy security updates, bug fixes, and new firmware updates

## IP protection, manufacturing flexibility, and savings

Pre-provisioned security certificates limits IP exchanges with contract manufacturers and reduces complexities

# Create differentiation with AWS IoT Greengrass

### Local messaging
Enable pub/sub device communication through local MQTT broker; no cloud connection required

### Data and state sync
Synchronize data when offline devices are reconnected using choice of protocol

### Lifecycle management
Manage lifecycle application from cloud or locally – deploy, restart, stop, update, and auto-restart on failure

### ML inference
Train models using SageMaker (or other services), deploy, and run ML inference locally with MXNet, TensorFlow Lite, SageMaker Neo, SageMaker Edge Manager

### Stream manager
Collect, process, and export high-volume data streams from edge devices

### Secrets manager
Store, access, rotate, and manage secrets locally from the cloud – credentials, keys, endpoints, and configurations

### Resource management
Configure the maximum amount of CPU and RAM usage, and pause, hibernate, or resume at application level

# Overcoming challenges from edge to cloud



Design

Manufacturing

Edge processing

Connectivity & Registration

Collection and processing of data

Analysis

Unlocking Insights

Management & Advisory

Efficiencies at scale

How to **securely connect** and **create value** from data?

# Offload connectivity and management with AWS IoT Core

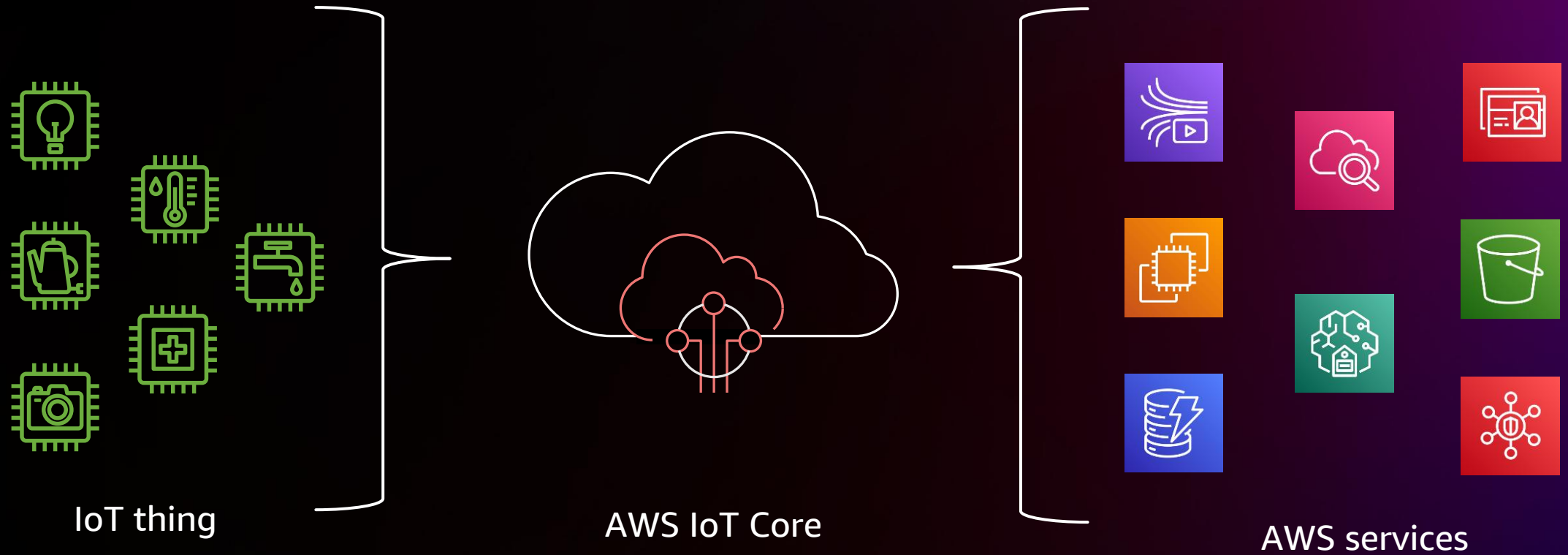| Identity service | Device gateway | Message broker | Rules engine | Device shadow | Registry | Device advisor |
|---|---|---|---|---|---|---|
| Manage authorization of devices and provision unique identities at scale | Fully managed connectivity optimized for IoT workloads | Communicate across your IoT fleet reliably and fast | Ingest large amounts of IoT data at a low cost, pre-process it, and make it available to 20+ services | Understand and control the status of your device at any time | Define and catalog device for easy use by AWS services | Fully manage test capability for IoT devices |

+ Specialized long-range connectivity with AWS IoT Core for LoRaWAN

# An entry point into the world of AWS services



IoT thing

AWS IoT Core

AWS services

# Overcoming challenges from edge to cloud

| Design | Manufacturing | Edge processing | Connectivity and Registration | Collect ion and processing of data | Analysis | Unlocking Insights | Management & Advisory | Efficiencies at scale |

**How to scale connected product business model and be competitive?**

# AWS IoT Device Management

**Bulk things registration**

Deploy and manage apps on millions of devices

**Fleet indexing and search**

Understand the health and status of your device fleet

**Device logging and monitoring**

Collect device logs to quickly identify and remediate problems

**Jobs**

Organize and initiate actions on groups of devices

**Secure tunneling**

Securely access devices behind restricted firewalls

# Unlock security management at scale

**Audit**

Validate IoT configuration is secure

**Detect**

Detect anomalies in device behaviors with machine learning or rule
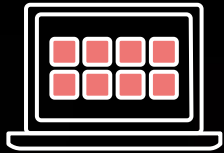
**Alerts**

Know when and what to investigate

**Mitigate**

Address identified issues

# Drive customer value through data

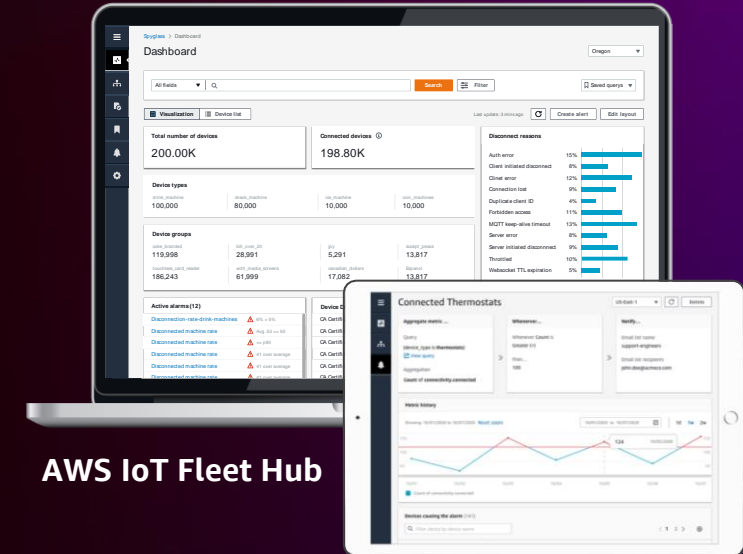Monitor your fleet    Take corrective action

Update devices    Securely access devices remotely

Troubleshoot and solve device issues quickly and cost-effectively, without having to physically send support staff

Establish trusted connections that adhere to customers' security policies

**AWS IoT Fleet Hub**

# So how does it all come together from edge to cloud?

# Offload functional tasks ..... focus on differentiation

**Security from edge to cloud**

### Design · Manufacturing · Edge processing

### Connectivity and Registration · Collection and processing of data · Analysis

### Unlocking Insights · Management & Advisory · Efficiencies at scale

**FreeRTOS**
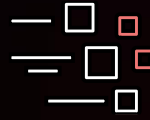Connectivity down to a microcontroller level

**AWS IoT ExpressLink**
Pre-configured connectivity modules for plug-and-play designs

**AWS IoT Greengrass**
Deploy, process, manage, and run solutions locally on your device

**AWS IoT Core**
Connect billions of IoT devices and route trillions of messages to AWS without managing infrastructure

**Amazon Kinesis Video Streams**
Capture, process, and store media streams for playback, analytics, and machine learning.

**AWS IoT Analytics**
Run and operationalize sophisticated analytics on massive volumes of IoT data

**AWS IoT Device Defender**
Audit configurations, authenticate devices, detect anomalies, and receive alerts to help secure your IoT device fleet

**AWS IoT Device Management**
Register, organize, monitor, and remotely manage IoT devices at scale

**AWS IoT TwinMaker**
Optimize operations by easily creating digital twins of real-world systems
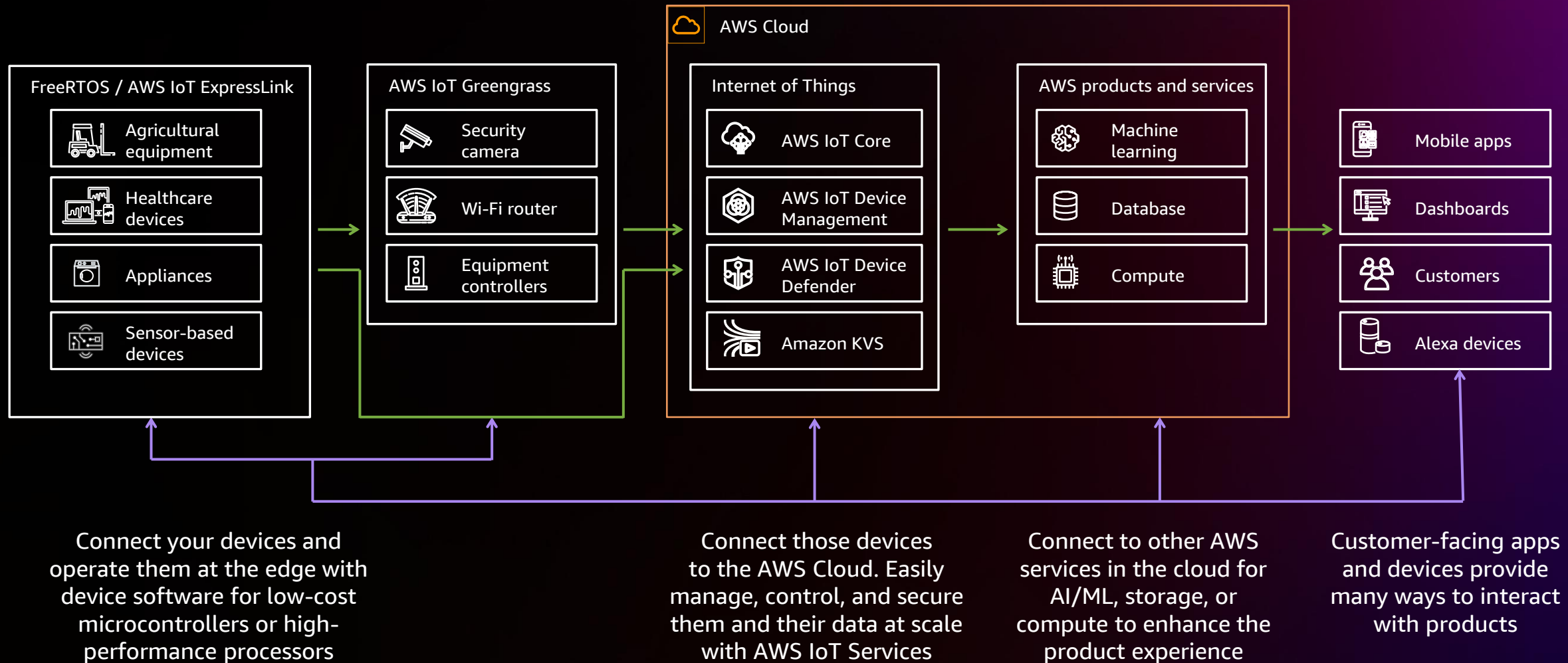
**AWS IoT SiteWise**
Collect, organize, and analyze data from industrial equipment at scale

**AWS IoT FleetWise**
Easily collect, transform, and transfer vehicle data to the cloud in near-real time

# How does it come together – From edge to cloud

**AWS Cloud**

**FreeRTOS / AWS IoT ExpressLink**
- Agricultural equipment
- Healthcare devices
- Appliances
- Sensor-based devices

**AWS IoT Greengrass**
- Security camera
- Wi-Fi router
- Equipment controllers

**Internet of Things**
- AWS IoT Core
- AWS IoT Device Management
- AWS IoT Device Defender
- Amazon KVS

**AWS products and services**
- Machine learning
- Database
- Compute

- Mobile apps
- Dashboards
- Customers
- Alexa devices

Connect your devices and operate them at the edge with device software for low-cost microcontrollers or high-performance processors

Connect those devices to the AWS Cloud. Easily manage, control, and secure them and their data at scale with AWS IoT Services

Connect to other AWS services in the cloud for AI/ML, storage, or compute to enhance the product experience

Customer-facing apps and devices provide many ways to interact with products

# AWS IoT Impact

| | | |
|---|---|---|
| **45B+**<br>Messages processed every day | **99.9%**<br>Service Level Availability for all IoT services | **45+**<br>AWS IoT Competency Partners |
| **500+**<br>AWS IoT offerings in the AWS Marketplace | **800+**<br>Qualified HW Partner devices | **35+**<br>Service updates in 2022 |

# Many companies are using AWS IoT to delight customers

# Generating value from edge to cloud
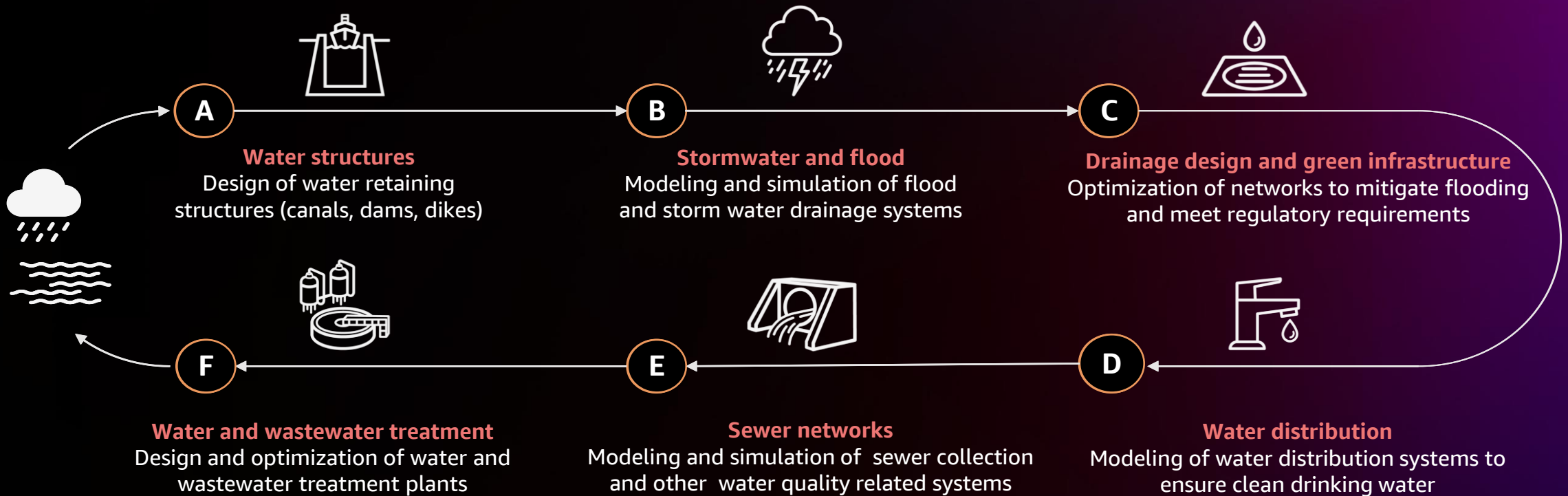
# Water Innovation with Innovyze at Autodesk

Boaz Brudner

Head of SaaS Engineering, AI and Architecture

Innovyze at Autodesk

# A trusted innovator for over 30 years



**A — Water structures**
Design of water retaining structures (canals, dams, dikes)

**B — Stormwater and flood**
Modeling and simulation of flood and storm water drainage systems

**C — Drainage design and green infrastructure**
Optimization of networks to mitigate flooding and meet regulatory requirements

**D — Water distribution**
Modeling of water distribution systems to ensure clean drinking water

**E — Sewer networks**
Modeling and simulation of sewer collection and other water quality related systems

**F — Water and wastewater treatment**
Design and optimization of water and wastewater treatment plants

- Design & Hydraulic Modeling
- Asset Management
- Operational analytics / Artificial Intelligence

# Working backward from the problems

### Service Quality
Ensure proper asset performance

### Water Scarcity
Help reduce leakage

### Regulatory Pressure
Monitor and report real time and time series data

**AUTODESK**

**Info360 Cloud**

**Operational Analytics**
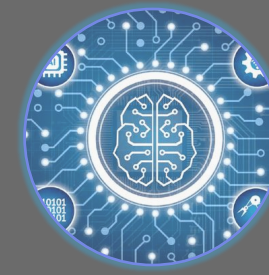
| | | | | | |
|---|---|---|---|---|---|
| **Drainage** | **Storm/Sewer/Flood** | **Water Distribution** | **Asset Management** | **Distribution Analytics** | **Plant Analytics** |
| InfoDrainage | InfoWorks ICM | InfoWorks WS Pro InfoWater Pro | Info360 Asset | Info360 Insight | Info360 Plant |

# Operational Analytics – Info360 Insight

# The solution must:

- Connect live and historical performance data

- Discover and visualize new insights in context

- Create real-time and historical reporting

- Gather and unify asset information

- Recommend best-case actions to maintain service levels

# Operational Analytics

## SPECIFICALLY FOR THE WATER INDUSTRY

- Minimize energy costs, water loss, and leakage

- Unified incident dashboards

- Report and communicate pertinent and justifiable decisions

✓ Managed workflows so you can focus your limited resources where they have the greatest impact.
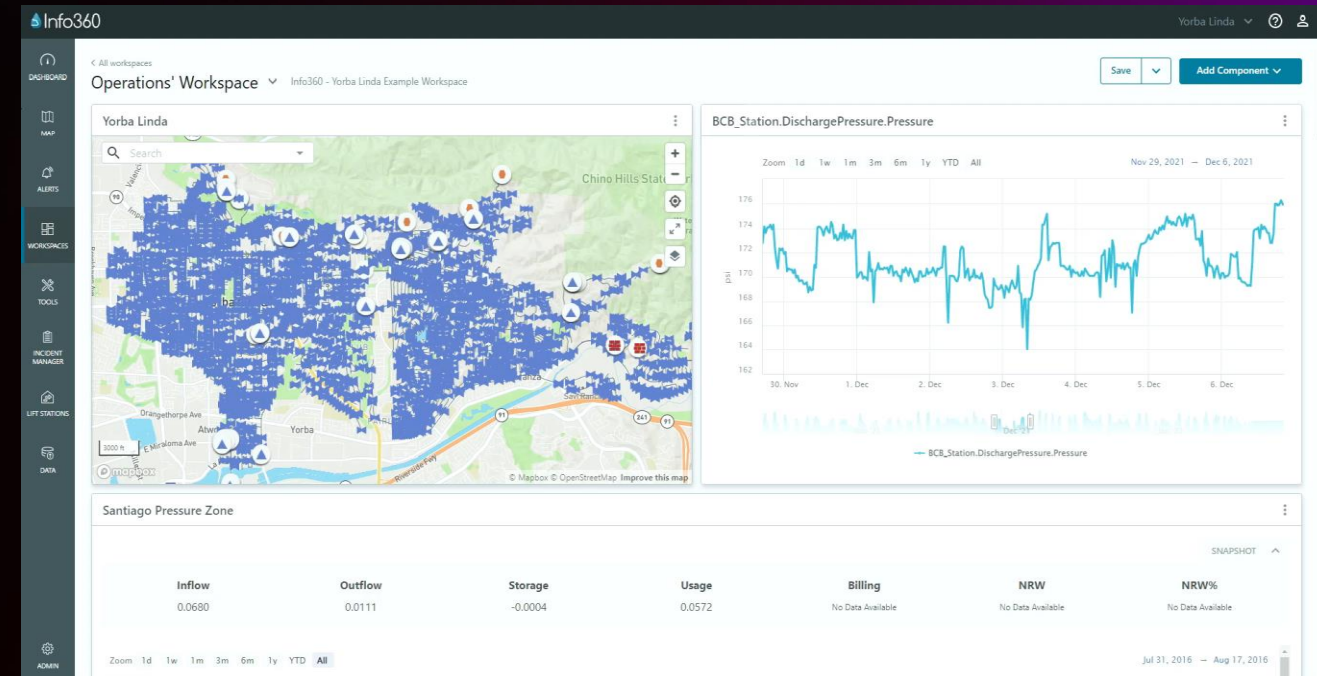
# But there was a challenge...

## SENSOR DATA IS LOCKED INSIDE ON-PREM DATA CENTERS

- Water utilities have closed sensor data systems

- Sensor data from edge devices is sent to SCADA systems (supervisory control and data acquisition)

- Data then is pushed for analytical needs to historians

- This data is highly sensitive therefore firewalled and highly guarded on-prem

- At the same time data volumes are very high

- **Challenge:** Push this data to the cloud securely in near-real time to power these advanced operational analytics solutions
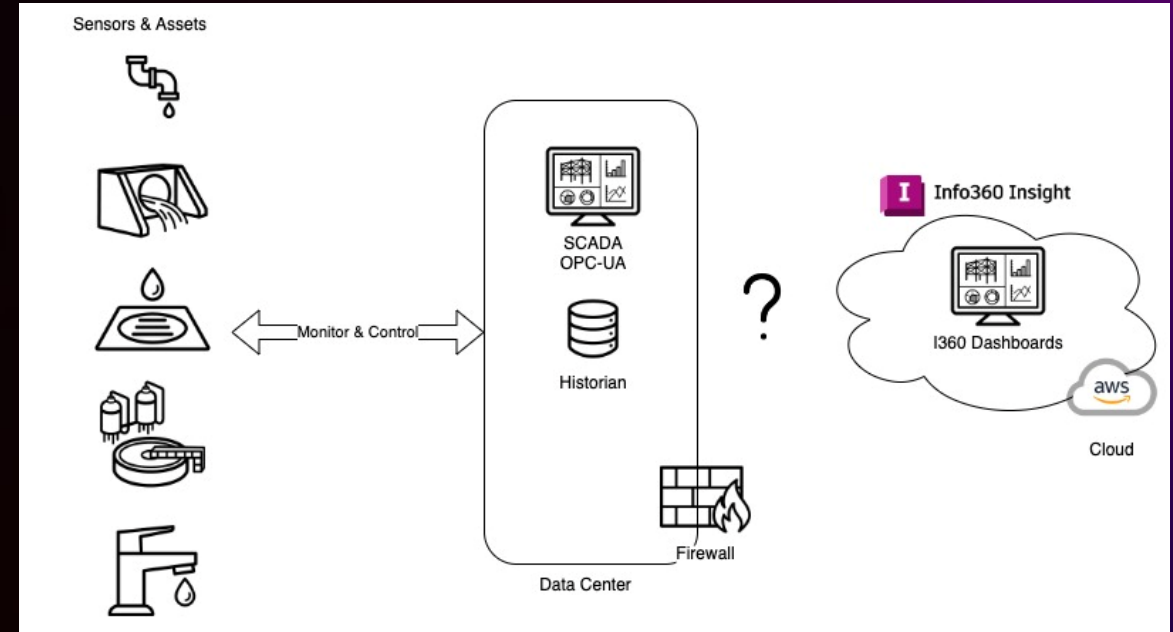
# So, we chose AWS IoT

- **Securely ingest** telemetry data from On-Prem SCADA/Historians with a downloadable data ingestor built on AWS IoT Greengrass

- **Manage large volumes of data** and satisfy security considerations with AWS IoT Core and Kinesis Firehose

- **Secure access** to on-prem data stores via AWS Secrets Manager

- **Minimize undifferentiated** heavy lifting

- **Up to 60% efficiencies** in development time

- **Prioritize serverless to seamlessly scale** and minimize DevOps overhead
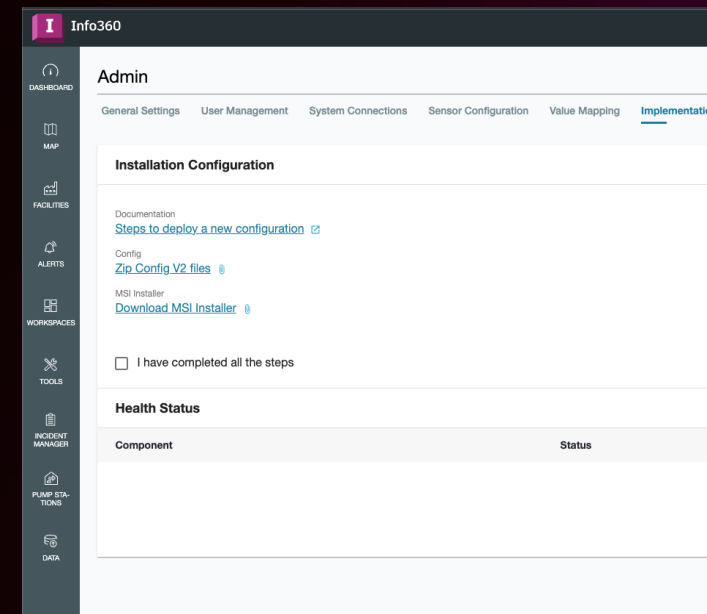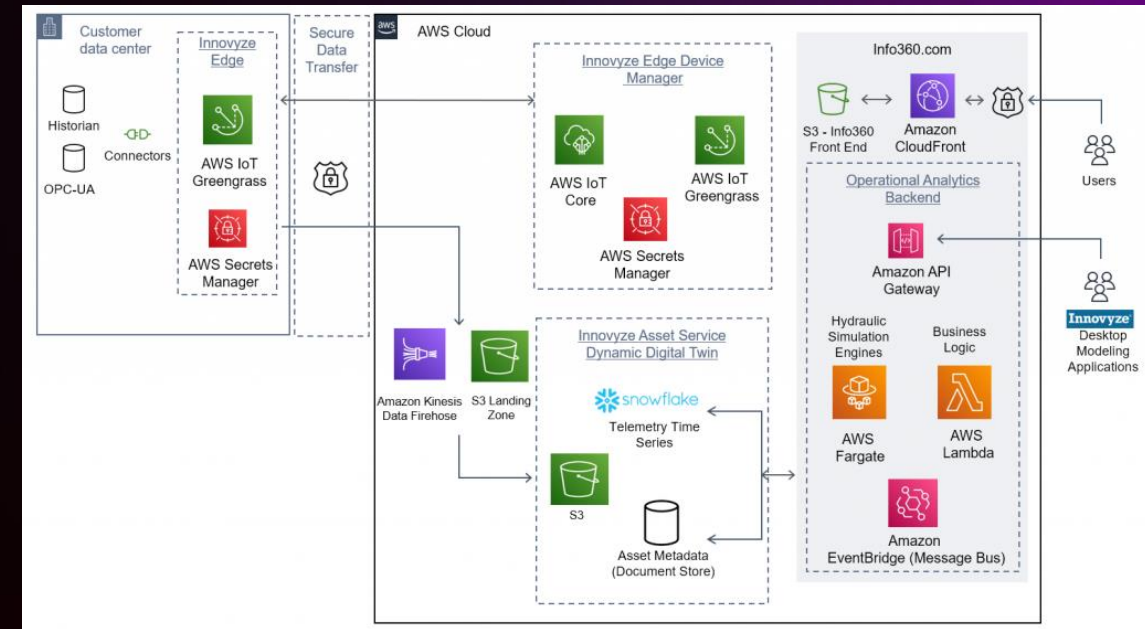
# Innovating in the Internet of "Virtual" Things

# Trend Micro

Eric Shulze (he/him)

VP of Product Management
Trend Micro

# About Trend Micro: Cybersecurity for 30+ years

- 500,000+ commercial customers in 200+ countries, including 9 of the top 10 Global Fortune 500

- 7000 people passionate about security across 65 countries

- AWS Advanced Technology Partner and Marketplace Seller

- 15 AWS Competencies and Service Ready Designations

- 2022 Global Partner of the Year, AWS Marketplace

# Problem to Solve

- Modern, scalable cloud networking for client to server communications

    ▪ Agent provisioning/authentication

    ▪ Bi-directional data transfer

- Support for 100M Agents

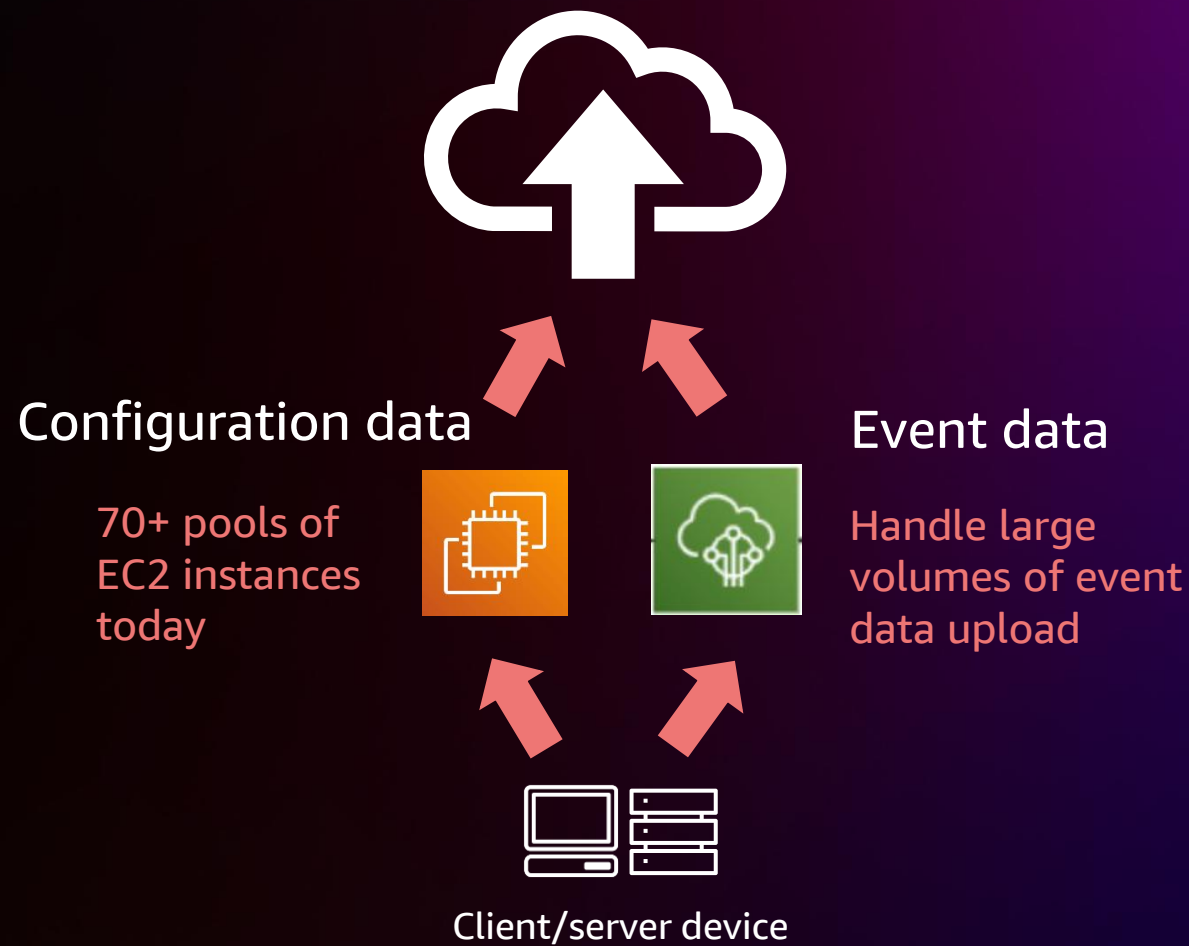- Easy to integrate into our current agent for transitional period
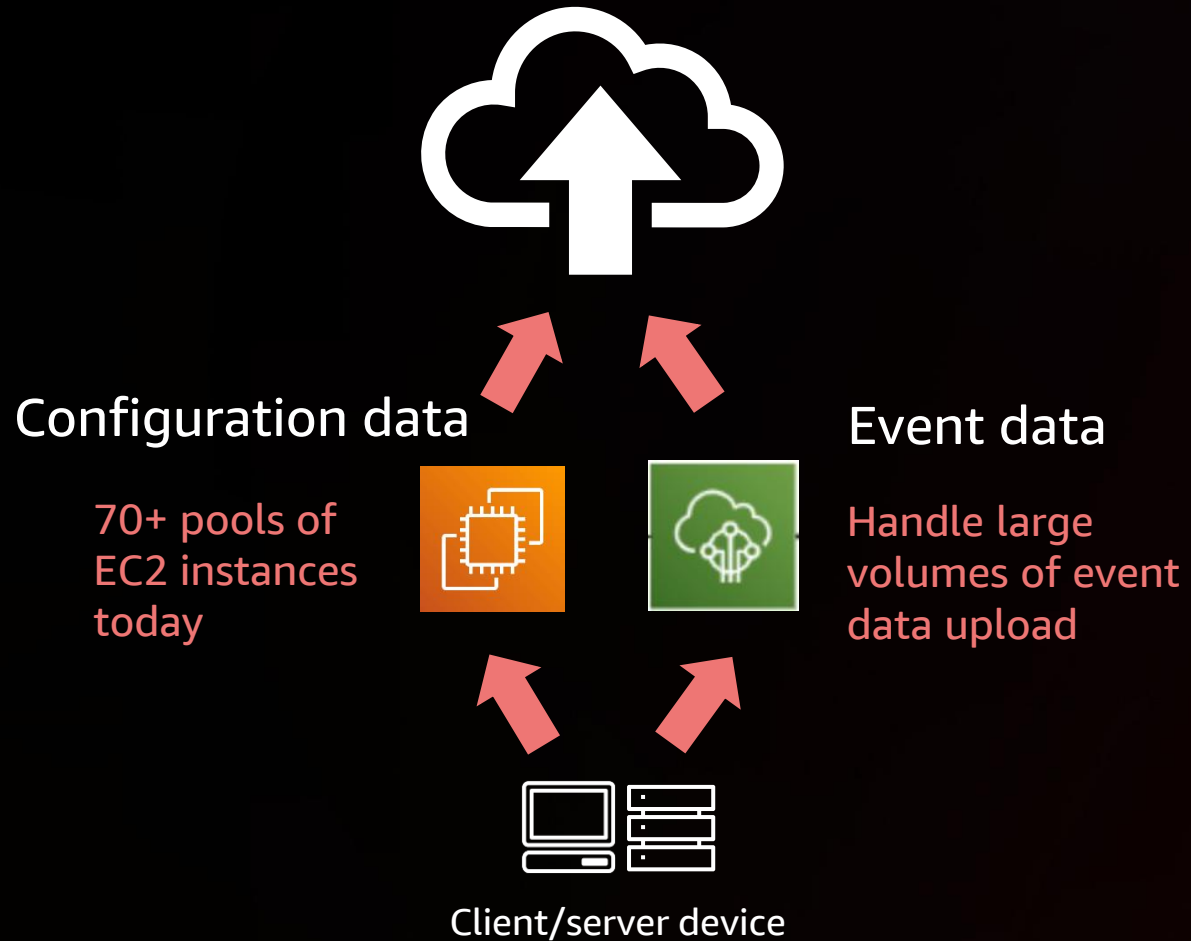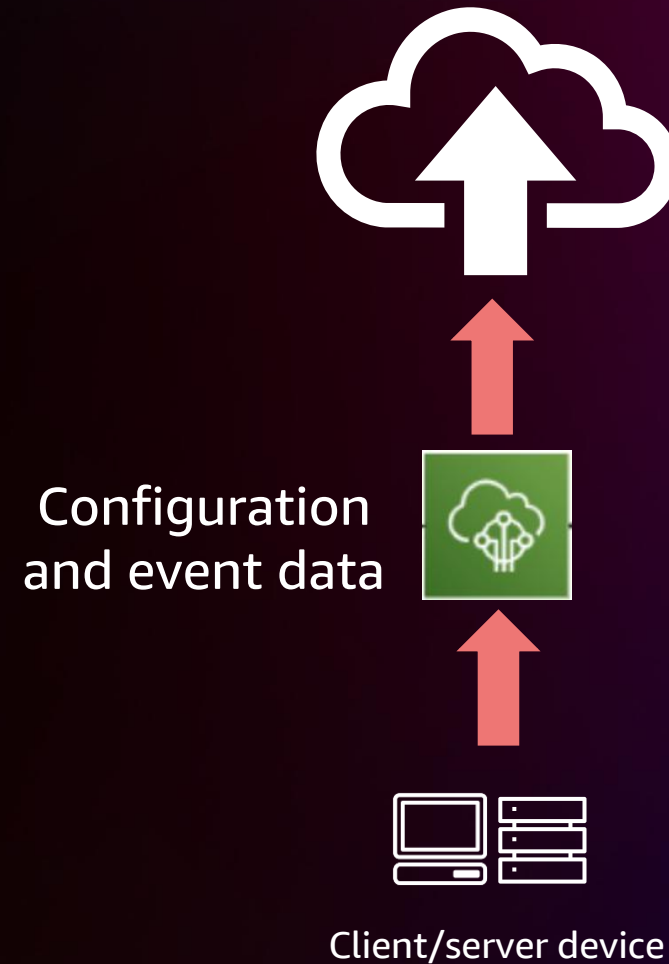
# Original

## SaaS monolith (AWS)

Configuration and event data

Client/server device

# Today

## SaaS hybrid (AWS)

Configuration data

70+ pools of EC2 instances today

Event data

Handle large volumes of event data upload

Client/server device

# Today

## SaaS hybrid  (AWS)



**Configuration data**

70+ pools of EC2 instances today

**Event data**

Handle large volumes of event data upload

Client/server device
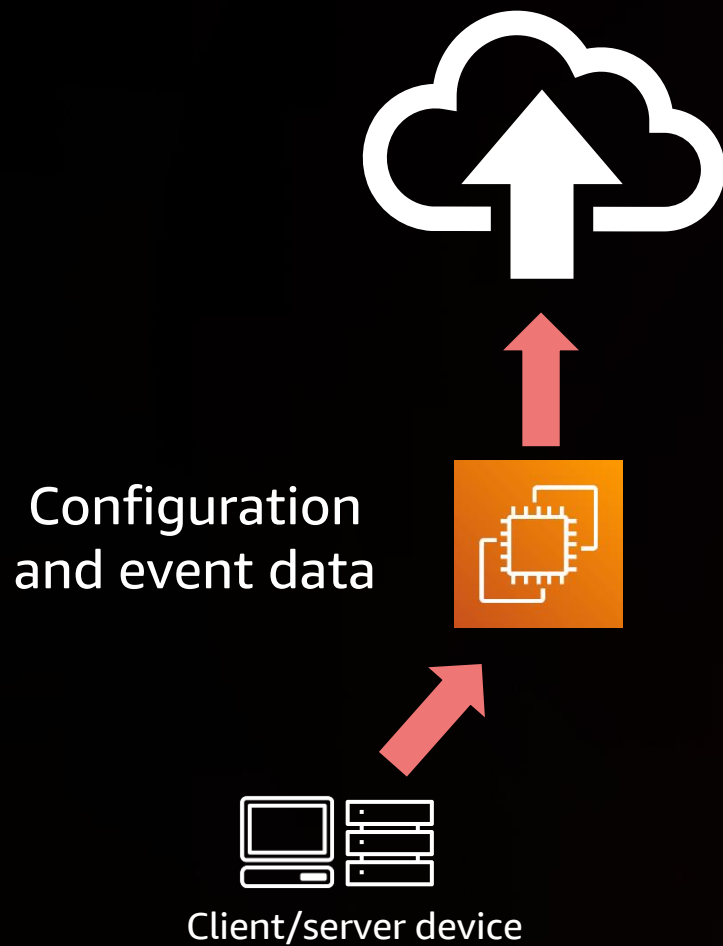
# Goal

## SaaS microservices (AWS)



Configuration and event data

Client/server device

# Why AWS IoT?

AWS IoT = Cloud-native networking

AWS handles scaling / agent-server retry, connection security, and authentication

Enable internal teams to run faster

Communicate to multiple agents more efficiently

**Want to learn more?**

**PRT327:** Design patterns for distributed client server systems via IoT

Level 1, Encore Ballroom 5, Encore

December 1, 2022, 11:00 AM – 12:00 PM

# Winning customer trust

# Paytm

Image source: paytm.com

# Paytm challenges

## Static QR code-based payment service

- Confirmation via push notification, SMS, or e-mail

## Higher fraud instances

- Intentional and unintentional

## Low merchant trust

- Barrier to adoption

Image source: paytm.com
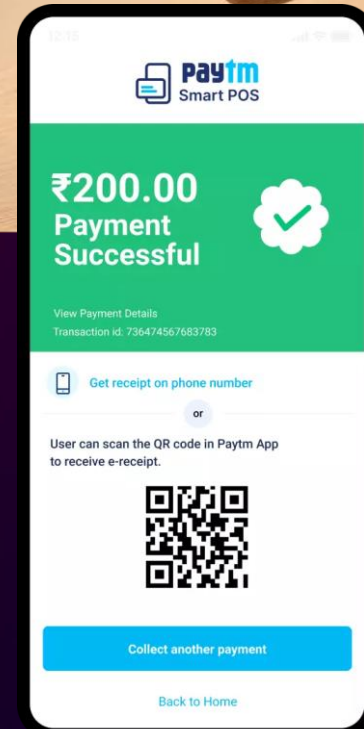
# Using IoT to delight customers

## Soundbox devices and dynamic QR code

- Built on AWS IoT
- Enabling contactless in-store payments
- Providing audio payment confirmations

## Reducing disruptions and building trust

- Up to 5x gross merchant value transactions

Image source: paytm.com

# Leverage AWS IoT to create efficiencies at scale

## Monitor, analyze, and automate

- Using AWS IoT Core for secure, reliable, and scalable MQTT connections

- Organizing their fleet and performing over-the-air updates with AWS IoT Device Management

- Identifying security gaps and vulnerabilities with AWS IoT Device Defender

- Creating customer value with Fleet Hub to perform remote troubleshooting

**4M+**

Soundbox devices

# New AWS IoT features to accelerate your differentiation journey

# New features – Device Software

| Service | Description | Features |
|---------|-------------|----------|
| **FreeRTOS** | **Real-time operating system for resource-constrained devices** | Extended Maintenance Plan (GA) |
| **AWS IoT ExpressLink** | **Preconfigured connectivity modules** | Technical specification v1.1 (GA)<br>Device On-boarding by claim (GA) |
| **AWS IoT Greengrass** | **Build intelligent IoT devices faster** | Edge broker for MQTTv5 (GA) |

# New features – Consumer IoT

| Service | Description | Features |
|---|---|---|
| **AWS IoT Core** | **Easily and securely connect billions of IoT devices** | MQTT v5 (GA)<br><br>AWS IoT Core Device Location (GA) |
| **AWS IoT Device Management** | **Remotely manage device fleets at scale** | Additional data sources for Fleet Indexing (GA)<br><br>Secure Tunneling updates (GA)<br><br>Jobs scheduling (GA) |
| **AWS IoT Device Defender** | **Manage fleet security at scale** | Device Defender integration with AWS Security Hub (GA)<br><br>Custom metrics for ML Detect |

# New – MQTTv5 (GA)

**Request/Response** for enhanced control

Easier message processing using **Rules Engine**

**Edge Broker** compatibility with AWS IoT Greengrass

Reduce bandwidth with **Topic Alias**

Enhance error processing with **Reason Codes**

**Define** Message/Session expiry timeouts
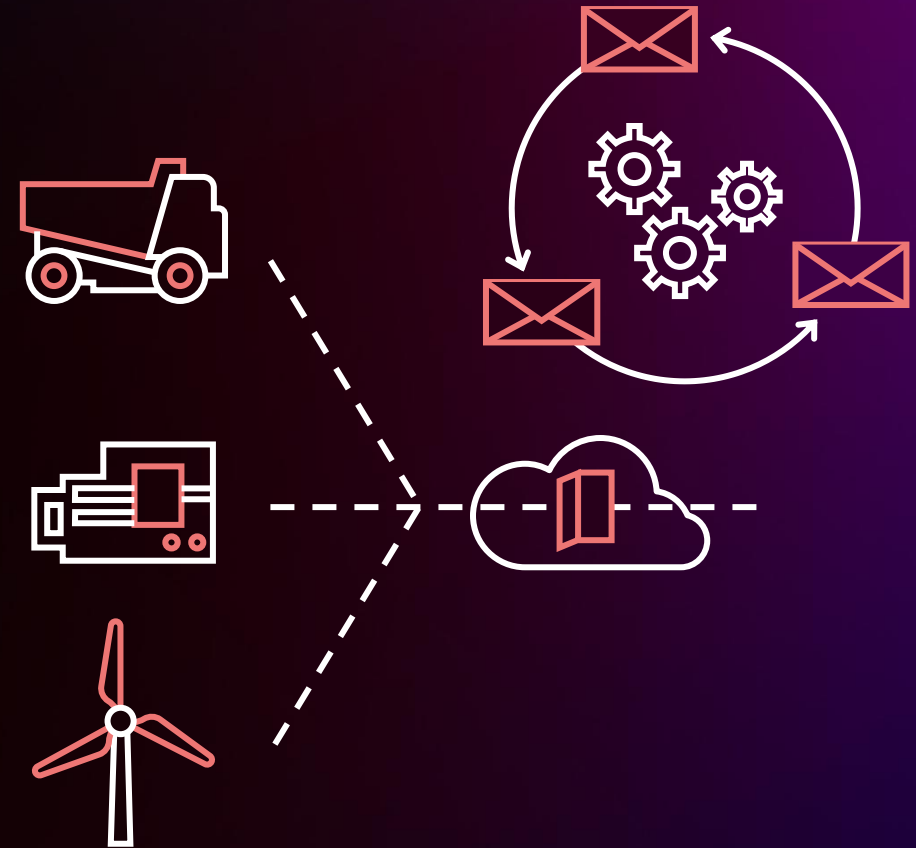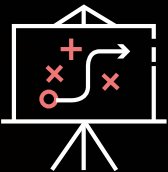
# New – AWS IoT Core Device Location (GA)

Simplified asset tracking solutions using LoRa Edge™ devices and AWS services
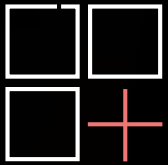
Activate low-power location applications – no built-in GPS required

Single console experience inside AWS IoT, including LoRa Cloud™

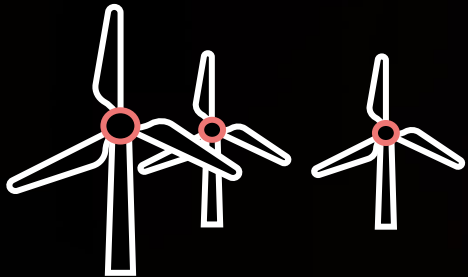Simplified integration with Amazon Location Service

MAXMIND

SEMTECH

here

# Amazon Location Service

- Shorter time to production

- Easy access to high-quality data

- Privacy and security

- Cost effective

Your applications
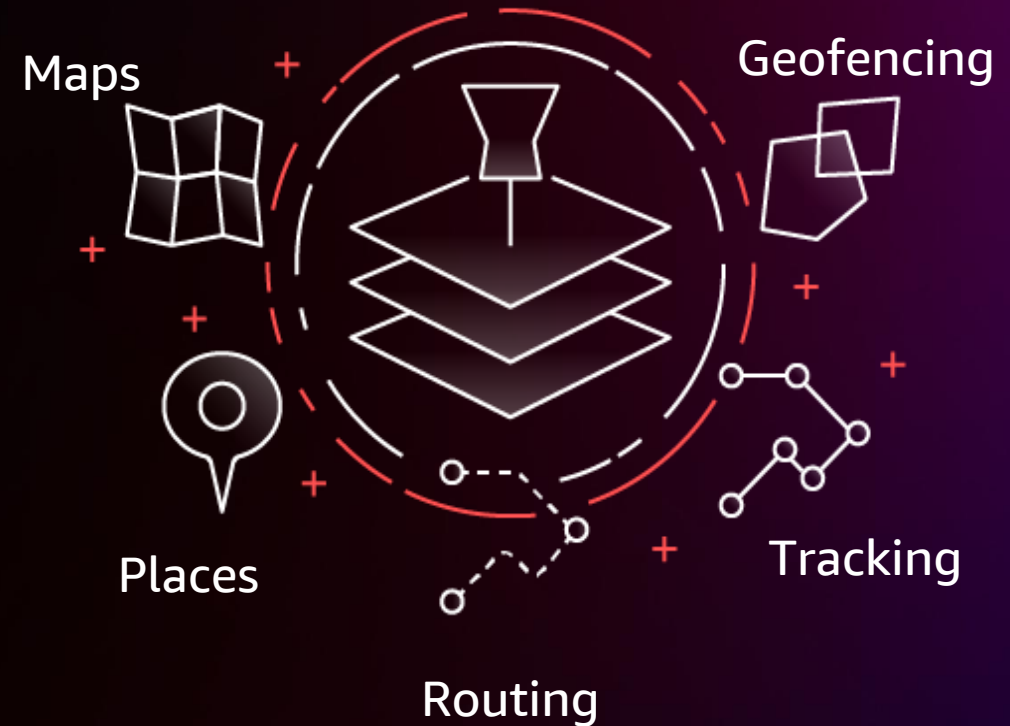
Maps

Geofencing

Places

Tracking

Routing
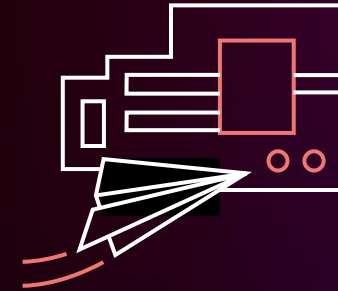
# New – Secure tunneling updates (GA)

SECURE TUNNELING PROVIDES SECURE CONNECTIVITY TO INDIVIDUAL DEVICES IN JUST A FEW CLICKS TO DIAGNOSE ISSUES AND TAKE ACTION TO SOLVE THEM

80% reduction in price per tunnel while keeping the maximum tunnel duration at 12 hours
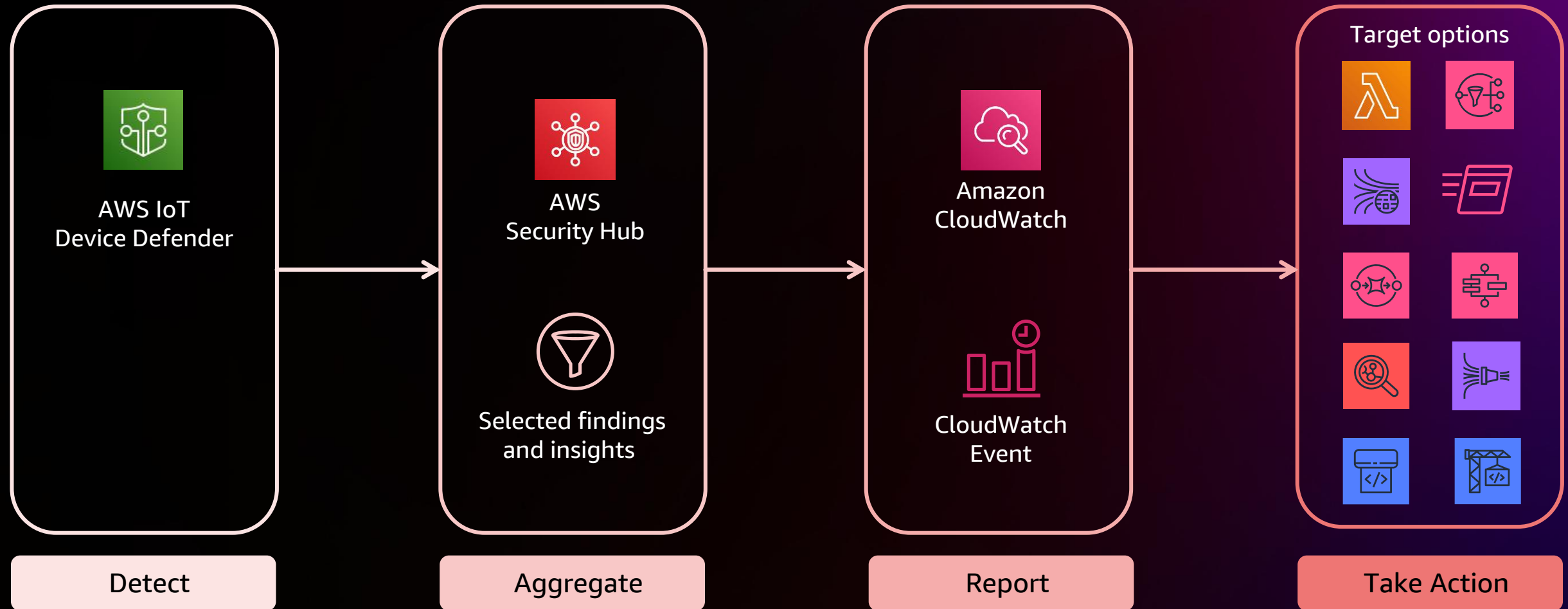
Support for multiple simultaneous TCP connections

Support for single-use token and token rotation capabilities, making remote connections more secure

+ New browser-based SSH to devices via secure tunneling

# New – AWS IoT Device Defender integration with AWS Security Hub (GA)



| Detect | Aggregate | Report | Take Action |

AWS IoT Device Defender → AWS Security Hub / Selected findings and insights → Amazon CloudWatch / CloudWatch Event → Target options

# Choosing the right approach

## CONSIDER HOW YOU'LL SECURELY BUILD, DEPLOY, AND MANAGE YOUR IOT APPLICATIONS AT SCALE

**Foundational services**

The broadest and deepest set of cloud services and partners to help customers create custom IoT applications
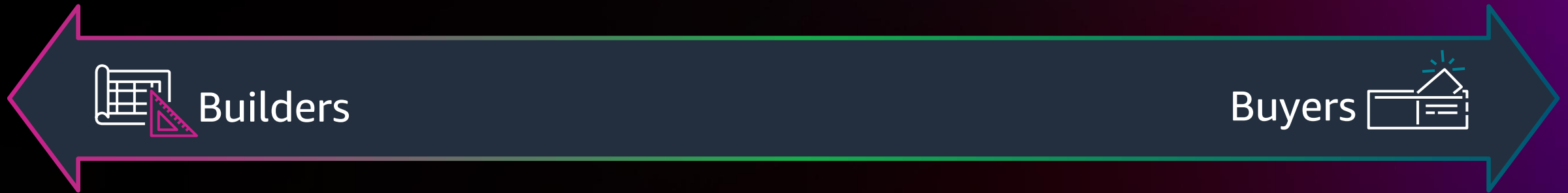
**Purpose-built services**

Services that simplify the time to build IoT applications for specific industries

**Solutions**

Consulting services from AWS Partners and AWS Professional Services and pre-packaged software solutions from AWS Marketplace
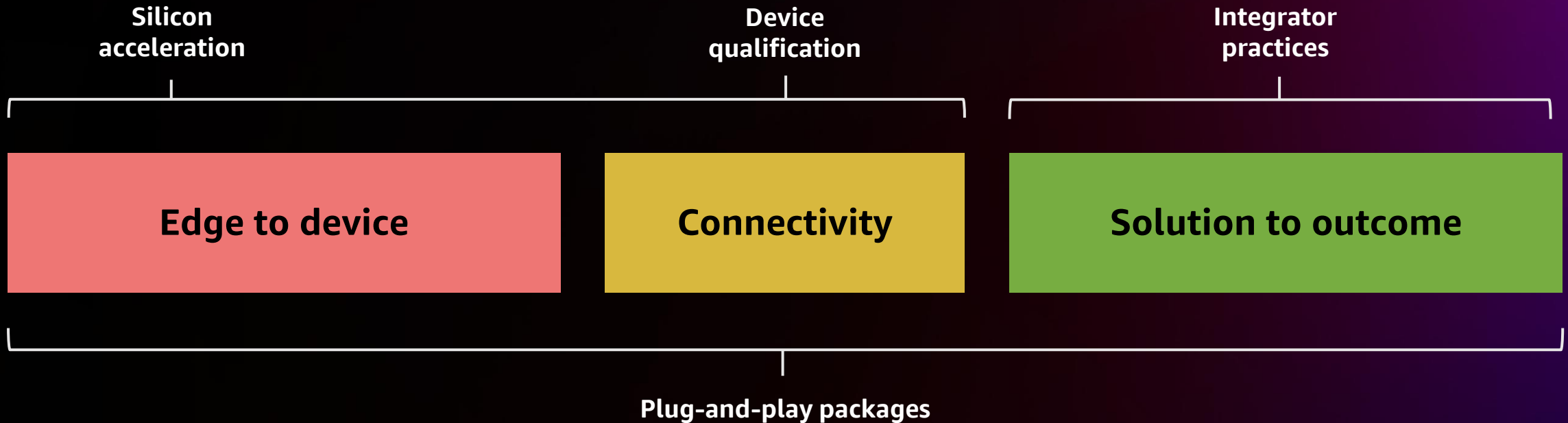
# Where do you fit in the builder–buyer continuum?

Builders ← → Buyers

| Building blocks of native AWS services | AWS IoT purpose-built services | AWS solutions that align with your specific needs | AWS ProServe, System Integrators, & Software Partner solutions |

# Let AWS and AWS Partners take care of the heavy lifting

Silicon acceleration

Device qualification

Integrator practices

| Edge to device | Connectivity | Solution to outcome |
| --- | --- | --- |

Plug-and-play packages

# Get started

Work with AWS specialists

Dive deeper with experts at an **SA Immersion Day**

Use a **ProServe Discovery Workshop** to scope projects and MVPs

Work with an AWS Partner

Find a plug-and-play package in the **AWS Marketplace**

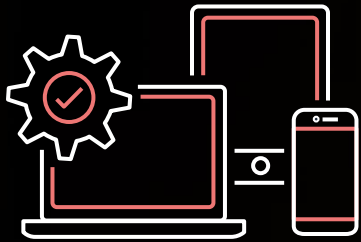Use the **IoT Solution Repository** to get purpose-built services
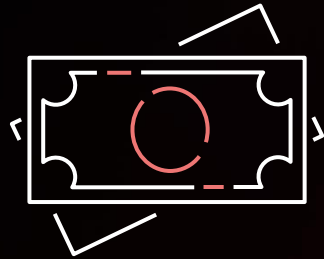
Try it with in-house teams

Deploy **AWS purpose-built services** for your industry use case

Build it yourself with **AWS building block services**

# How will you differentiate and delight your customers today?

Easy to use – "it just works"

Saves me money

Improves quality of life using smart data insights

Adapts to my evolving needs

# Thank you!

Shyam Krishnamoorthy

linkedin.com/in/shyamkrishnamoorthy

Boaz Brudner

linkedin.com/in/boazbrudner

Eric Shulze

linkedin.com/in/ericshulze

Please complete the session survey in the **mobile app**