

Unlocking the promise of IoT

Connecting Devices to the Cloud



Agenda

AWS for IoT Solutions

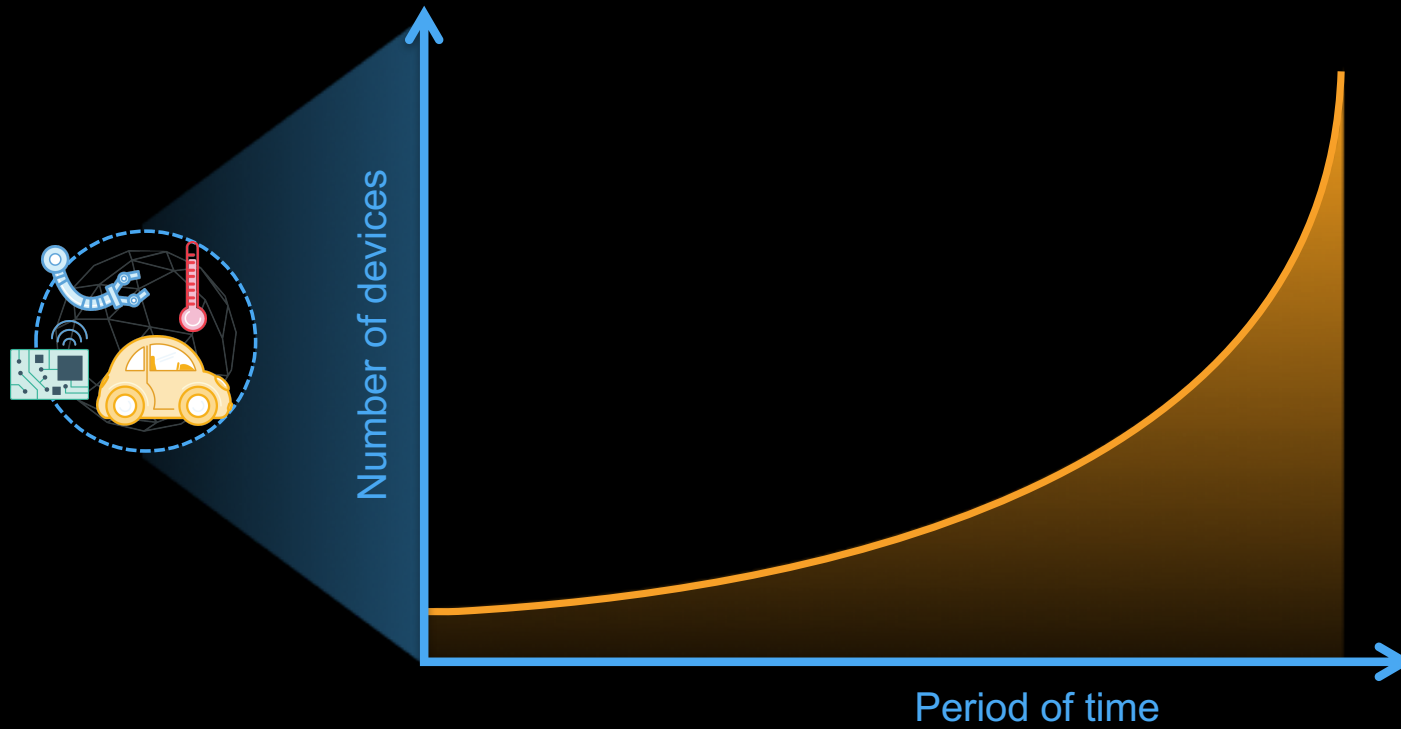
- ✓ AWS IoT
- ✓ AWS Greengrass
- ✓ AWS Starter Kits
- ✓ Alexa

Use Cases

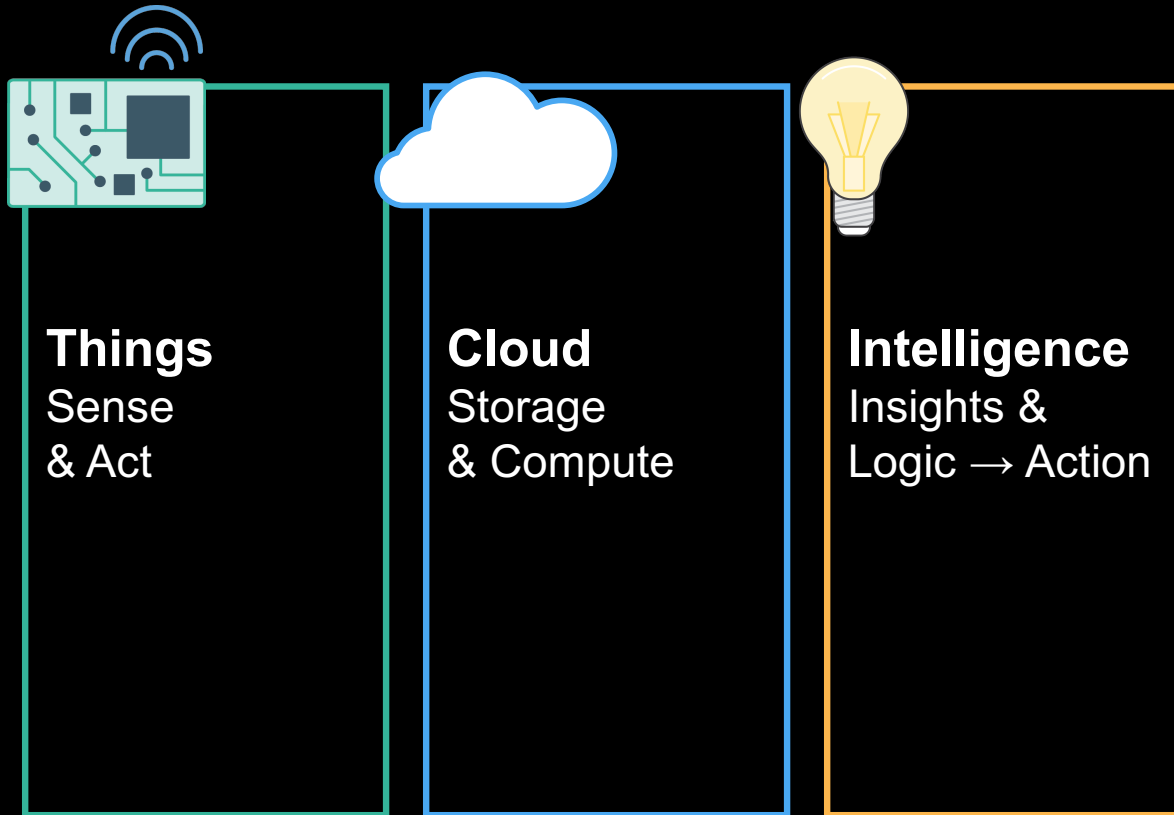
Customer Stories

Are the analysts right?

A **numbers** approach



Three pillars of IoT



The Heavy Lifting With IoT



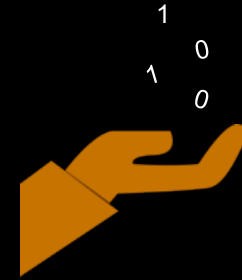
Devices



Network



Security



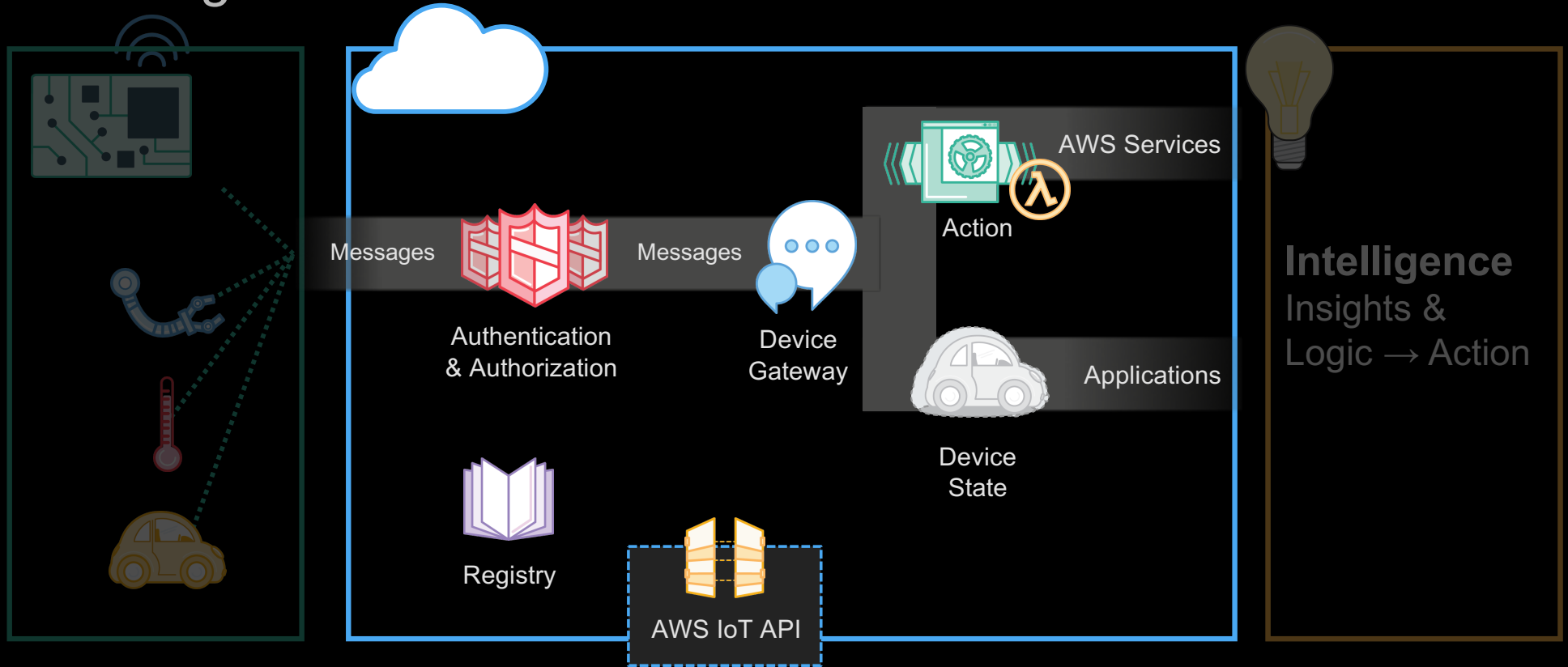
Data Collection



Smarts

AWS IoT

Starting in the **cloud**

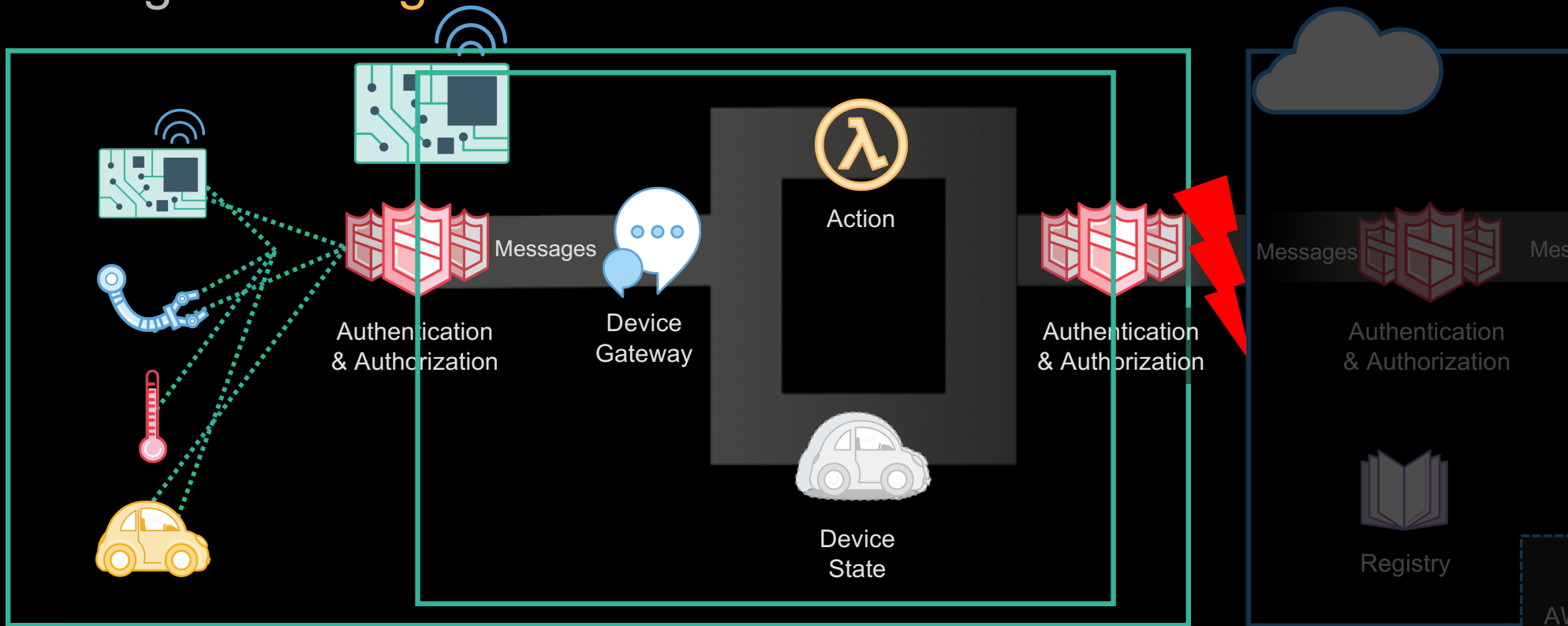


AWS IoT Strengths

- Focus on **Security**, End to End
- It's a **Serverless**, managed service
- Built on **modern architecture**:
messages, events, rules, functions – at
scale
- **Front door** to all of AWS
- Any **Chipset**
- Any **Operating System**
- **Protocol** Agnostic
- Cost follows **usage**

AWS Greengrass

Going to the **edge**



Most machine data never reaches the cloud



Medical equipment



Industrial machinery

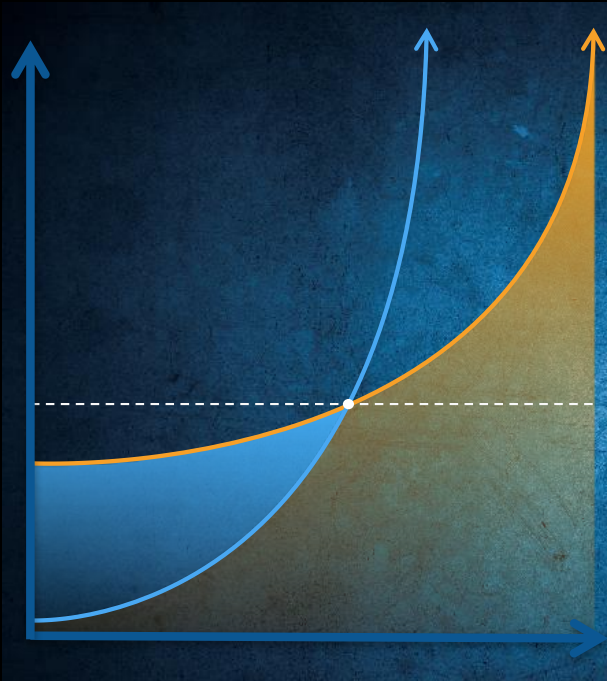


Extreme environments

Why this problem isn't going away



Law of physics



Law of economics



Law of the land

AWS Greengrass is:

- Local logic execution
- Local triggers (message and broker)
- Security and access
- State sync with the cloud

***Note: Greengrass is NOT Hardware
(You bring your own)**

Many applications require
edge compute

- Local timely decision making
- Privacy/regulatory requirements
- Functionality without connectivity



The screenshot shows the AWS Greengrass website interface. At the top, there's a navigation bar with the Amazon logo and 'web services'. Below that, a green banner features the text 'AWS Greengrass' and a sub-headline: 'Extend AWS Lambda and AWS IoT to local devices. Process device data locally, even when you are temporarily disconnected.' To the right of the text is a circular diagram with various IoT icons like a wind turbine, a tractor, and a factory. Below the banner, there's a section titled 'Request Access to the Limited Preview' with a form containing two input fields: 'First Name:' and 'Last Name:'. A small paragraph of text explains that Greengrass is in limited preview and requires an AWS Account Number to apply.

Sign up at: <https://aws.amazon.com/greengrass>

Benefits of AWS Greengrass



Respond to local events quickly

Operate **offline**



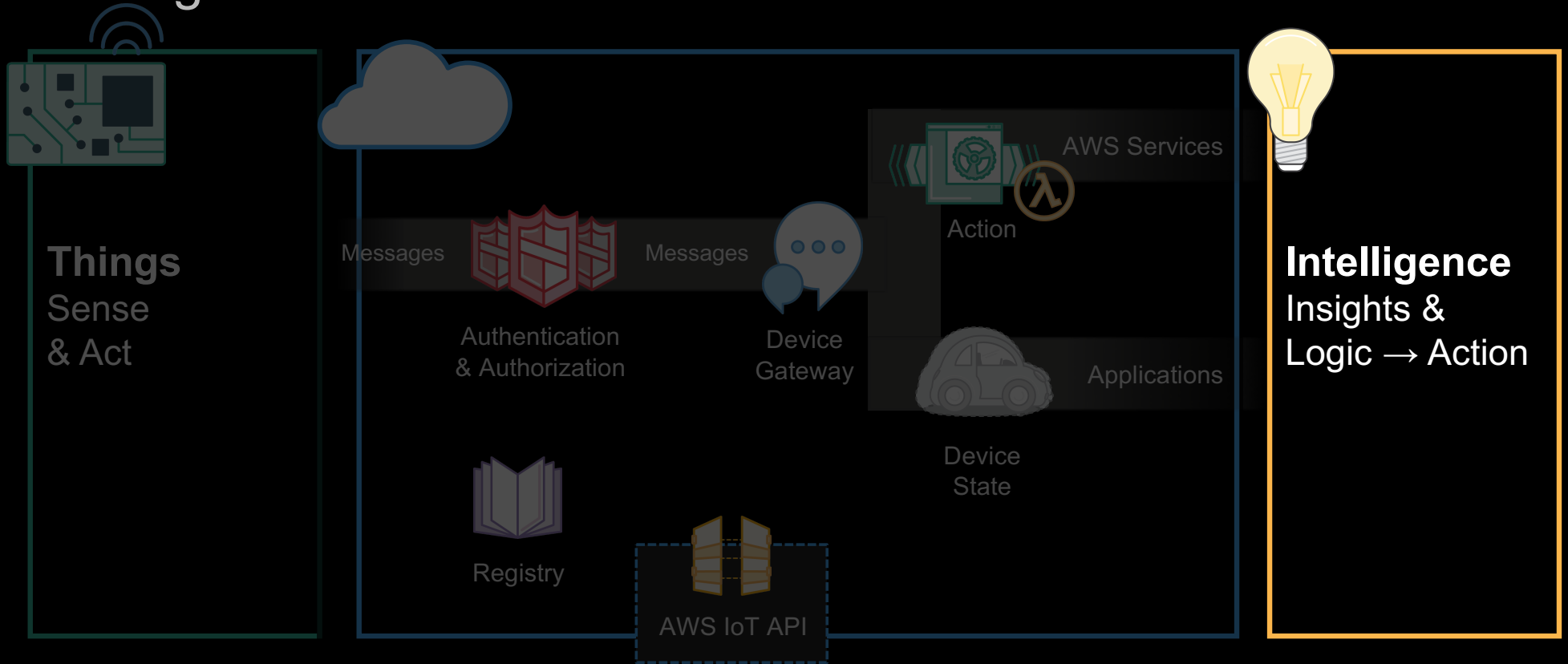
Simplified device programming



Reduce the cost of IoT applications

AWS IoT

Intelligence in the **cloud**



AWS IoT

Getting smarter

Data driven decisions,
value from insights

- Rules engine integration of

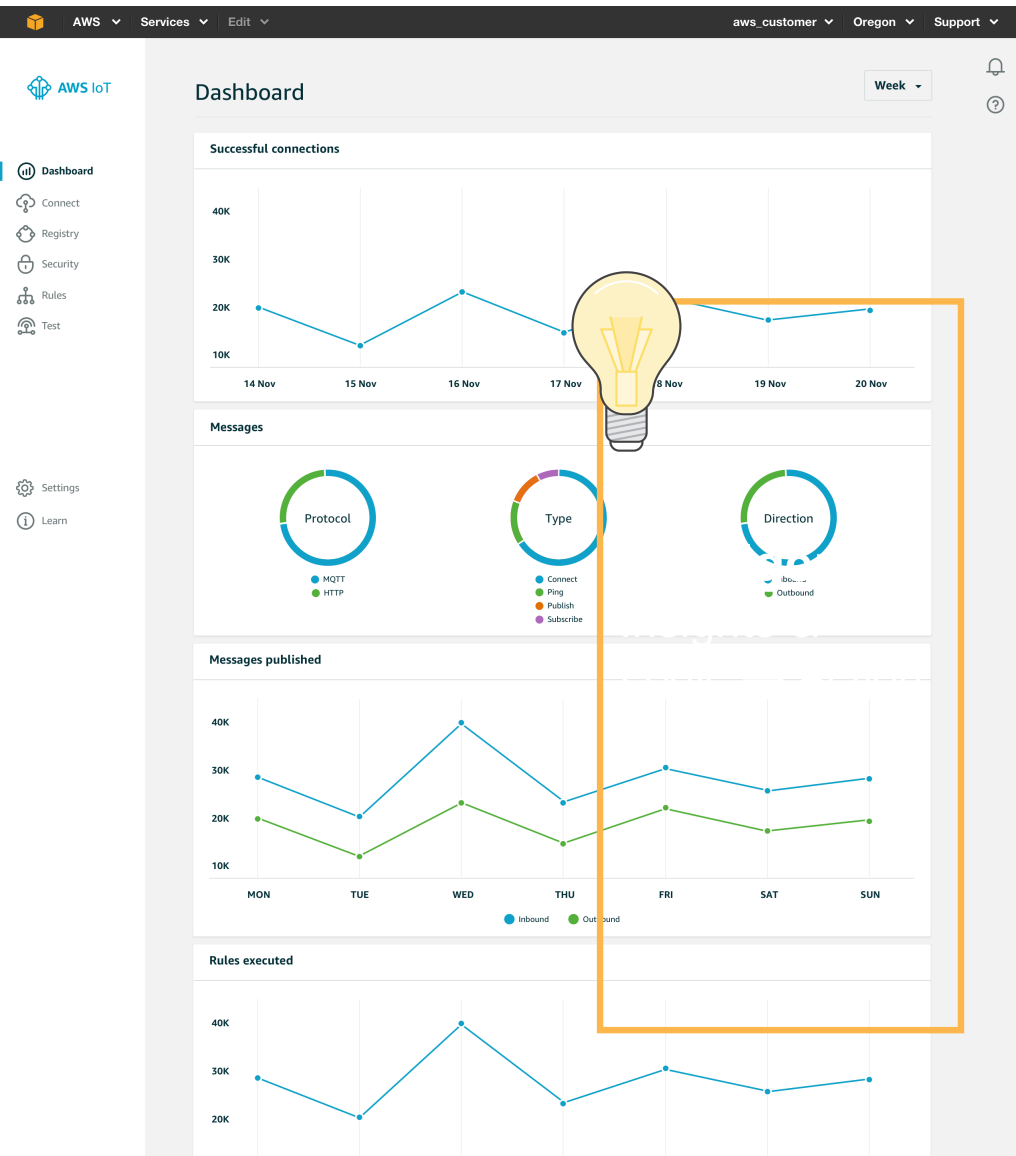


Amazon Machine Learning (AML)



AWS ElasticSearch & Kibana (ELK)

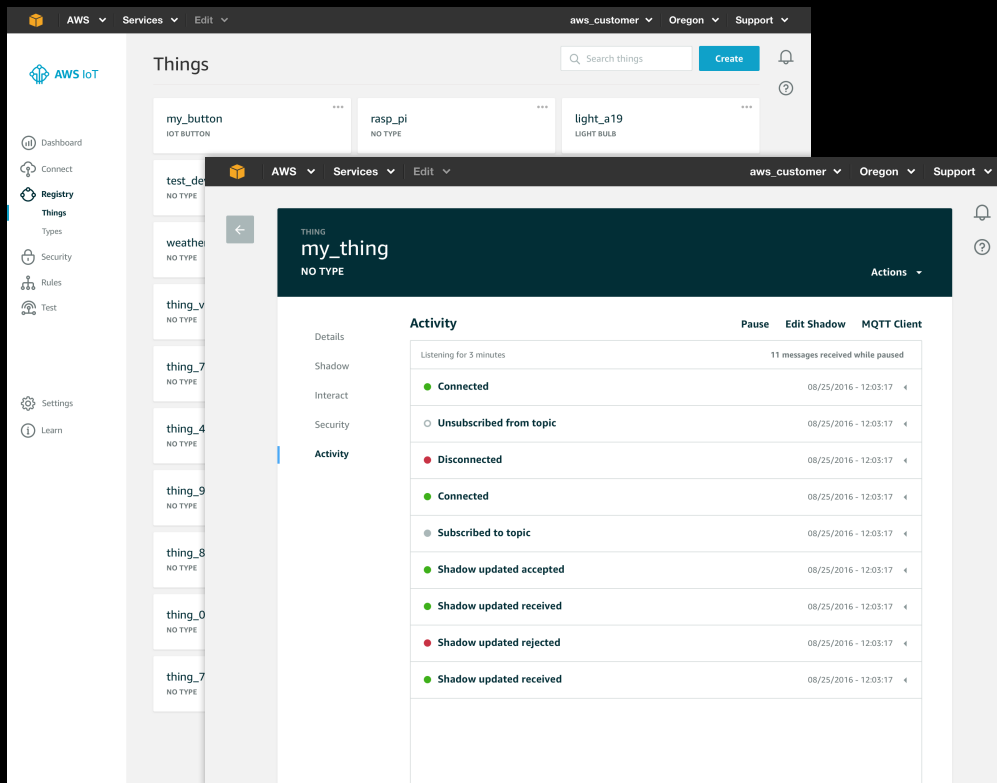
- Dashboards



AWS IoT

Easier to **use** and **deploy**

New IoT Console



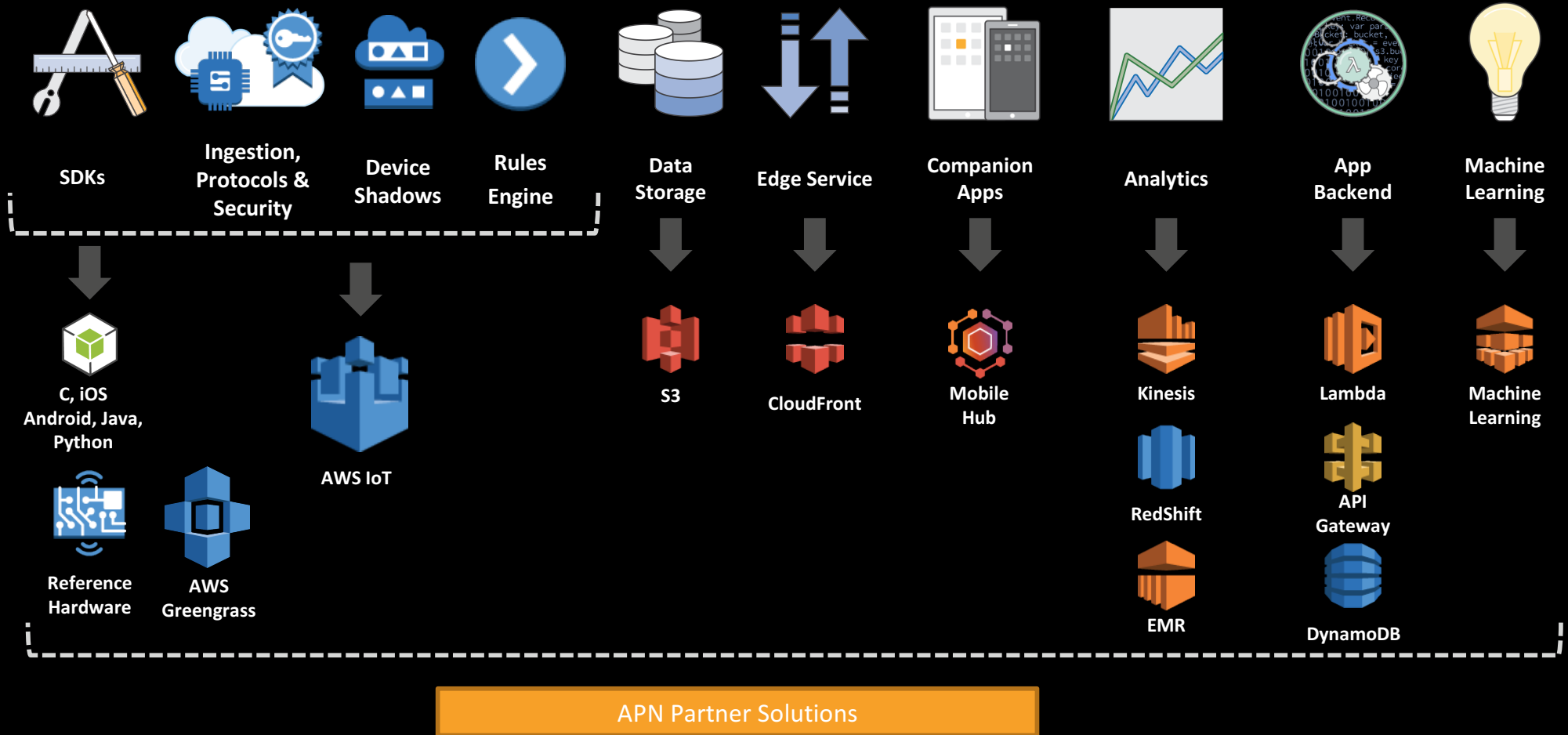
Security OoB at Scale
(Atmel/Microchip)



Key enablers

- Bring your own certificates (BYOC)
- Just in time registration (JITR)

AWS – Comprehensive Platform For IoT



Simplest way to build end-to-end solutions

IoT Button Developers

- Order on Amazon.com
- Easy to program
- Get started in minutes



ORIGINAL IOT BUTTON

Purchase now on Amazon.com

\$20 in AWS credits per account

ALL-NEW IOT BUTTON

Pre-order now, ships in February

2x the battery life (2,000 clicks)

Learn more at <https://aws.amazon.com/iotbutton/>



AWS IoT Starter Kits



BUILDING VOICE EXPERIENCES

Be Ready For Your Customers Whenever They Ask For You



amazon alexa

THE ALEXA ECOSYSTEM

Supported by two powerful offerings



ALEXA SKILLS KIT



Create Great Content:
ASK is how you connect to your consumer



Automated Speech Recognition (ASR) & Natural Language Understanding (NLU)

ALEXA VOICE SERVICE



Unparalleled Distribution:
AVS allow your content to be everywhere



Combining power of AWS IoT & Alexa

- **Alexa** - With the Alexa Skills Kit, you can easily build and add your own skills to Alexa.
- **AWS IoT** manages the connection devices and integration with ASK, as well as other backend systems and companion apps.
- Build skills for Alexa using **AWS Lambda**. Simply write the code using and upload it as a Lambda function.
- **Alexa Voice Service** brings voice-powered experiences to any connected devices.



Use Cases ...

Smart Campus Use Cases

Assisted Vehicles



Waste Management



Traffic & Parking



Campus Safety



Transportation



Student Connection



Energy & Utilities

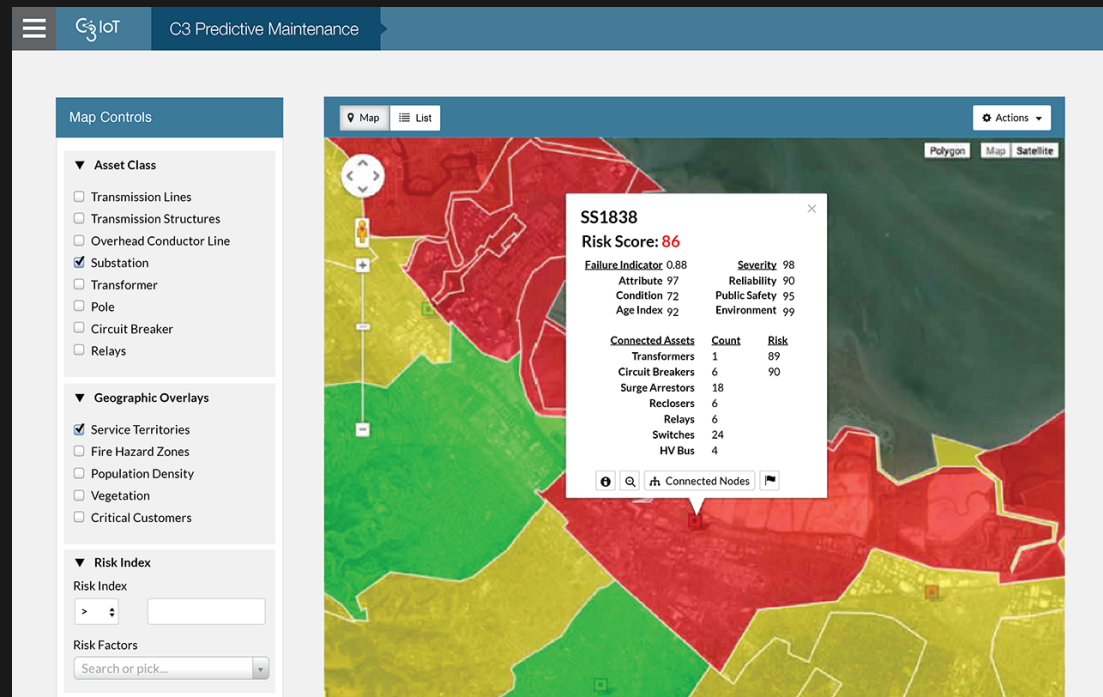


and many more...

Example: Predictive Maintenance

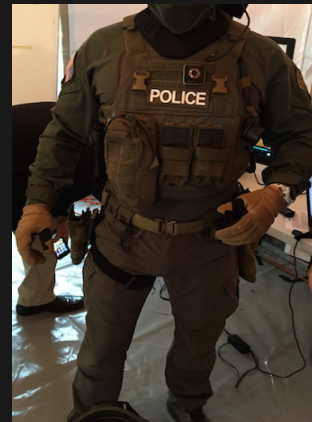


A comprehensive set of diagnostic and operational insights to evaluate and monitor equipment and system performance, identify assets at risk of failure, and avoid costly downtime

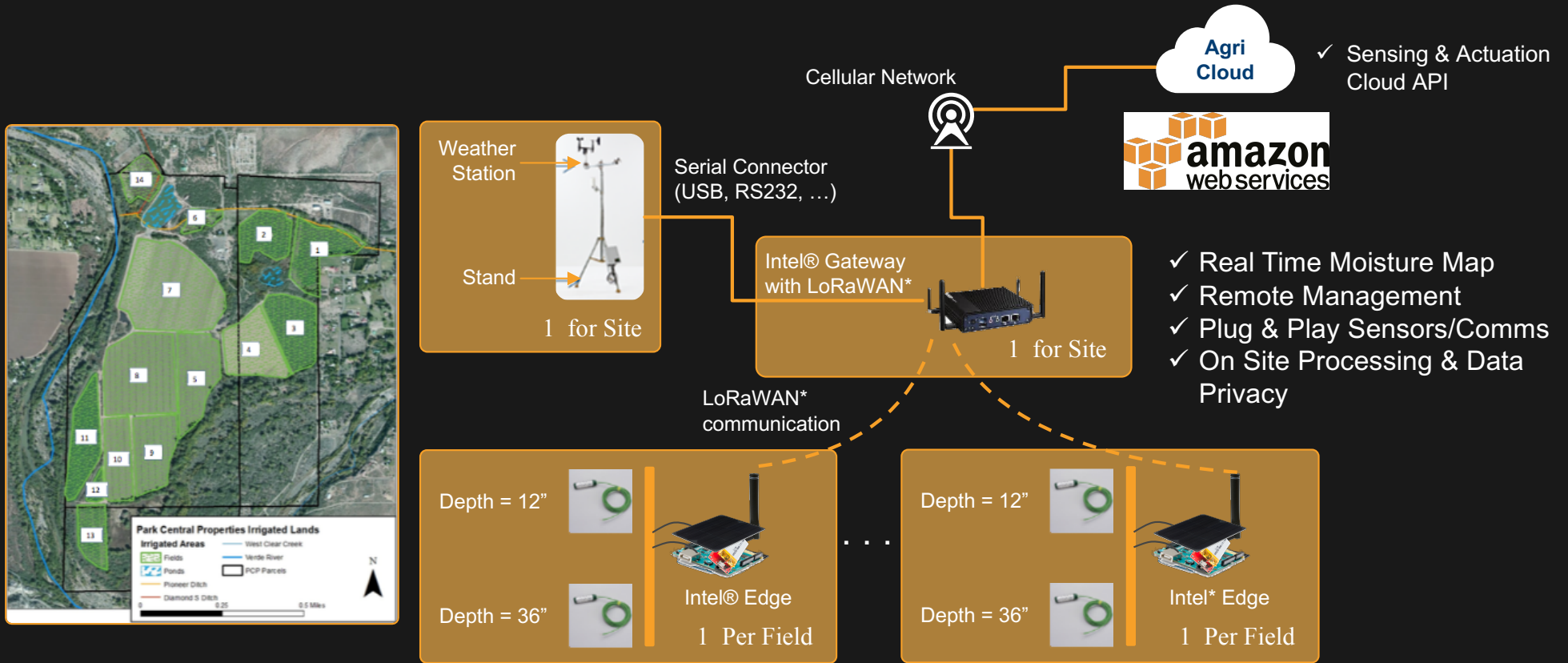


Example: First Responder, Safety

- A Wireless Services Gateway based upon Intel Edison connects with peripheral devices such as the Intel Basis watch, bodycams, and other environmental sensors. It encrypts the data and employs a LTE modem to transmit the information to the command center.
- The command center aggregates the data streams from individual first responders and provides a UI dashboard enabling monitoring of this information by command center personnel.



Example: Farming, Agriculture

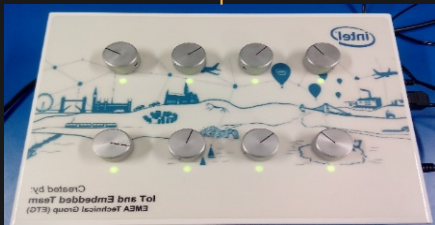


*Other names and brands may be claimed as the property of others.

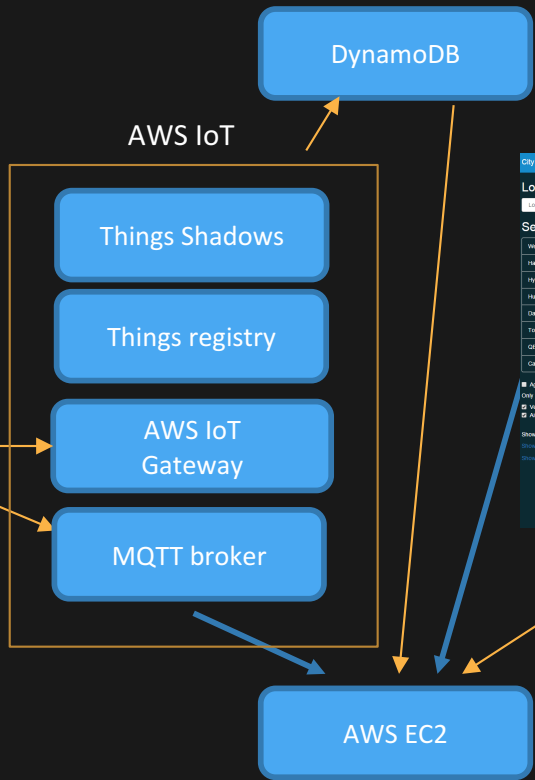
Example: Congestion Charge



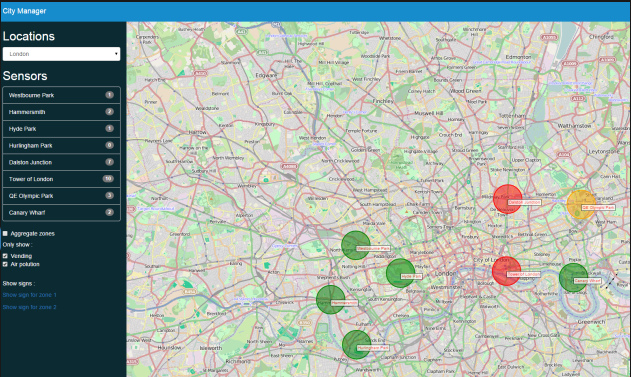
Sensor data from 8 separate channels fed into A/D inputs of DK100



Intel DK100 Gateway



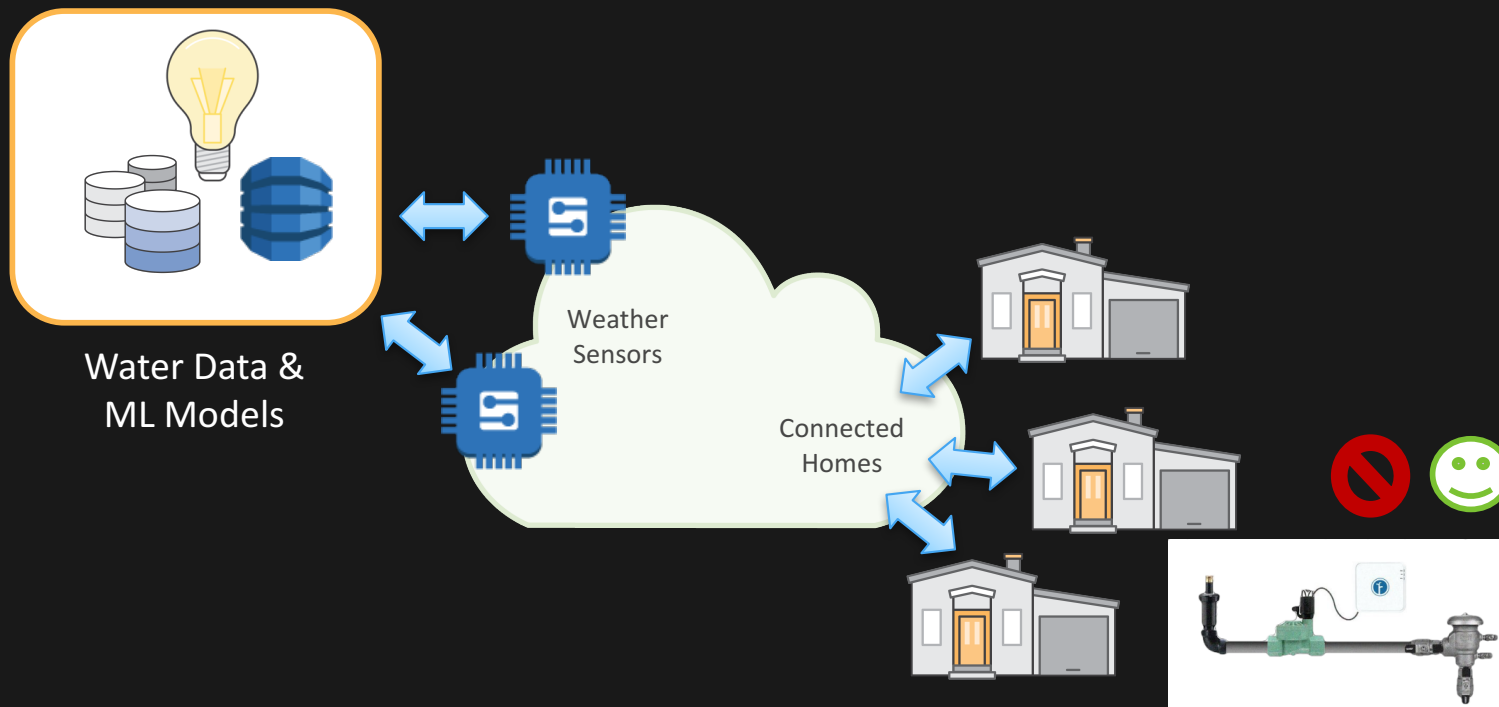
Cloud based dashboard (UI) on client PC/tablet



LONDON ZONE 1	
CO2 LEVEL	LOW
CONGESTION CHARGE	€ 5
PARK & RIDE DISCOUNT	0 %

LONDON ZONE 2	
CO2 LEVEL	MED
CONGESTION CHARGE	€ 10
PARK & RIDE DISCOUNT	35 %

Example: Water Conservation

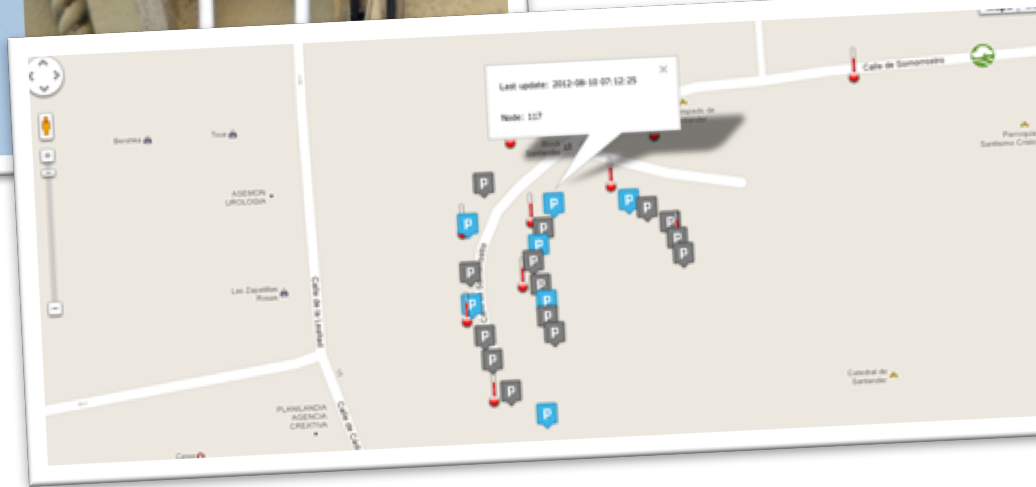
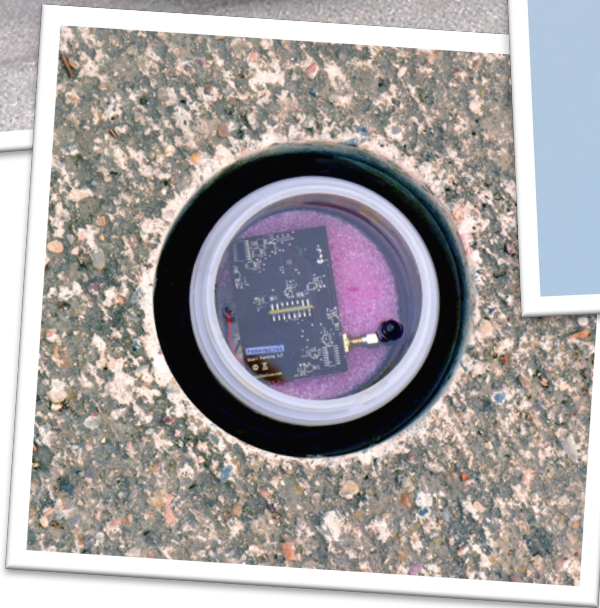




SMART LIGHTING



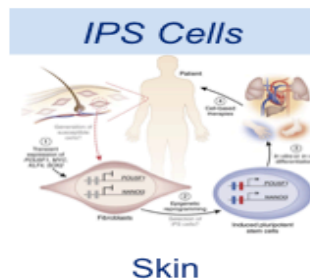
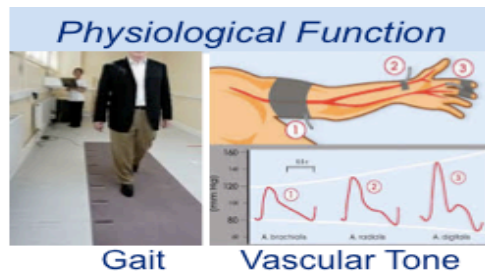
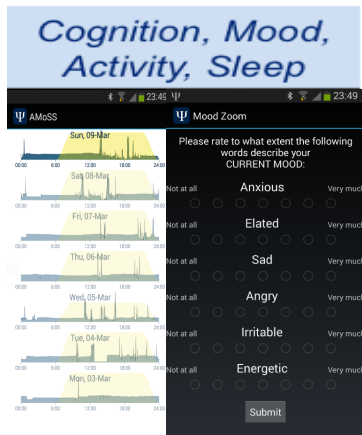
SMART PARKING



Some Customer Stories...

Alzheimer's Biomarkers: The Healthy Aging Study

- Goizueta Foundation \$25 million transformational gift
- The challenge: identify predictive AD biomarker during middle age (who, when)
- The opportunity: **100,000 patients** as partners → the Emory Healthy Aging Study
- Extensive phenotyping of health – *from MRI to mHealth*



PetaJakarta – Flood Detection



- **University of Wollongong's** Global Challenges Program and a Twitter data grant
- Mobile mapping and local flood information for the city of **Jakarta, Indonesia**
- 28 million citizens of Jakarta share real-time flood information in a part of the world increasingly affected by flooding
- Location-enabled mobile devices, manual water gauges, water-level-sensing devices
- University of Wollongong is continuing development on its IoT water-level sensors, leveraging solar power and power management to make the sensors suitable for long-term, wide-scale deployment in Jakarta and other cities.

University X

- Energy efficiency, sustainable, and green building solution
- IoT sensors pick up temp, humidity, and other environmental factors in buildings and data is sent to cloud via AWS IoT service
- Data from energy consumption is sent to AWS
- Aggregated data is processed in AWS to provide insights into energy consumption

TRANSIT SCREEN

5:02 PM ☀️
Friday, March 11 71°

<p>16th & M (northbound) 3 MIN WALK</p> <p>S9 Silver Spring Station Northbound 4, 12 MIN</p> <p>S2 Silver Spring Station Northbound 7, 8 MIN</p>	<p>Farragut North Metro 8 MIN WALK</p> <p>RD Glenmont 8 MIN</p>	<p>14th & Rhode Island Ave NW 9 BIKES 12 EMPTY DOCKS</p> <p>Thomas Circle 8 BIKES 21 EMPTY DOCKS</p>
<p>16th & M (southbound) 3 MIN WALK</p> <p>S4 Federal Triangle Southbound 3, 15 MIN</p> <p>S2 Federal Triangle Southbound 10, 13 MIN</p>	<p>McPherson Square Metro 7 MIN WALK</p> <p>SV Wiehle-Reston East 6 MIN</p> <p>BL Largo Town Center 10 MIN</p>	<p>1435 Rhode Island Ave NW 6 MIN WALK</p> <p>1510 15th St NW 7 MIN WALK</p>
<p>K & 15th 3 MIN WALK</p> <p>D1 Glover Park Westbound 5, 36 MIN</p> <p>D6 Sibley Hospital Westbound 5, 18 MIN</p>	<p>K & 14th DC Circulator 6 MIN WALK</p> <p>CIR Georgetown - Union Station Westbound 5, 12 MIN</p> <p>CIR Georgetown - Union Station Eastbound 8, 11 MIN</p>	<p>UBER</p> <p>uberX 1.6x 5 MINUTES AWAY</p>

Now 71° CLEAR

6 PM 67° PARTLY CLOUDY

7 PM 63° PARTLY CLOUDY

8 PM 61° PARTLY CLOUDY

Powered by Forecast

TRANSIT SCREEN





**STREET
BUMP**



Intersection Count



Roundabout Count



Road Volume Data



Vehicle Gap Data



Pedestrian & Bicycle Pathway Count



Pedestrian & Bicycle Junction Count



EASY AND SECURE CONNECTIVITY FOR YOUR CITY

Access to data from existing and new transportation infrastructure is fundamental to building a Smarter City. Spectrum provides quick and easy connectivity for data and insights.



TURNKEY SOLUTION

Install Spectrum hardware in your traffic cabinets in 20 minutes. Gain access to your signal data from Miovision Signals or your CMS. No software to install. No servers. No cable runs.



EASY TO INTEGRATE

Spectrum integrates with all your traffic cabinet equipment to make data easily accessible through the AWS IoT cloud hosted platform.



BUILT-IN SECURITY

Spectrum provides added network security to legacy traffic control equipment. It's designed to secure your data, network applications and equipment.



Miovision's mission is to empower cities to use data to improve the transportation experience for everyone.

13,000 MUNICIPALITIES SERVED IN 66 COUNTRIES



MIOVISION TECHNOLOGY IS BEING USED AT CLOSE TO 50% OF THE TRAFFIC INTERSECTIONS IN NORTH AMERICA.

U.S. State Dept. – Enterprise IoT Platform

State Department Deploying Internet of Things Platform to Monitor Energy Use

The platform will collect and analyze hundreds of thousands of data points, using machine learning and cloud-based infrastructure, in an effort to support energy management



Analytics platform to manage energy use and sensor health in real time across **22,000 buildings** in more than 190 countries.

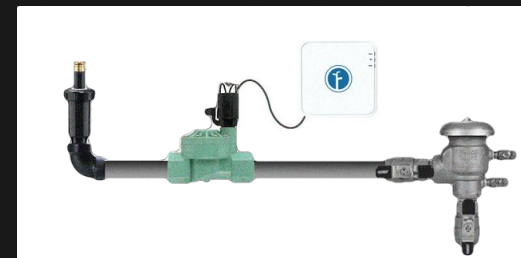
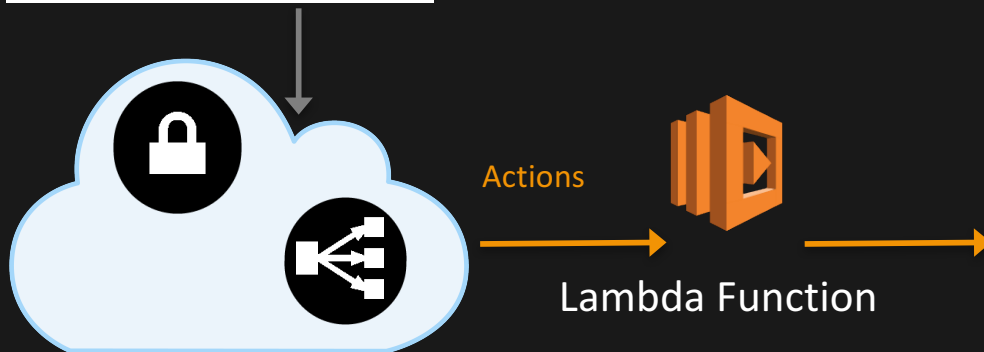
Rachio: Sprinkler Control



Easily calibrate soil, vegetation, slope, sun exposure, and nozzle types.

Choose From National And Personal Weather Stations To Get The Most Accurate Weather Data Available.

No One-size-fits-all Experience - You Have The Freedom To Make Adjustments Over Time And Tune Your Rachio To Your Unique Landscape.



Connected Sprinkler Controller

Utility - Body Worn Cameras



Smartest body-worn technology in the world, incorporating real-time communications for the best situational awareness possible during the most critical times.

Automatic recording triggers based on policies, officer down reporting and alerting, live video streaming, and secure automatic wireless offload to AWS cloud storage.

Video, audio and metadata can be accessed through its cloud-based digital evidence management solution, AVaiL Web™.

Utility's Rocket IoT™ in-car video and Smart Redaction™ application for releasing video to the public, also leverage AWS cloud storage. Providing mission critical mobile intelligence.

Questions?