

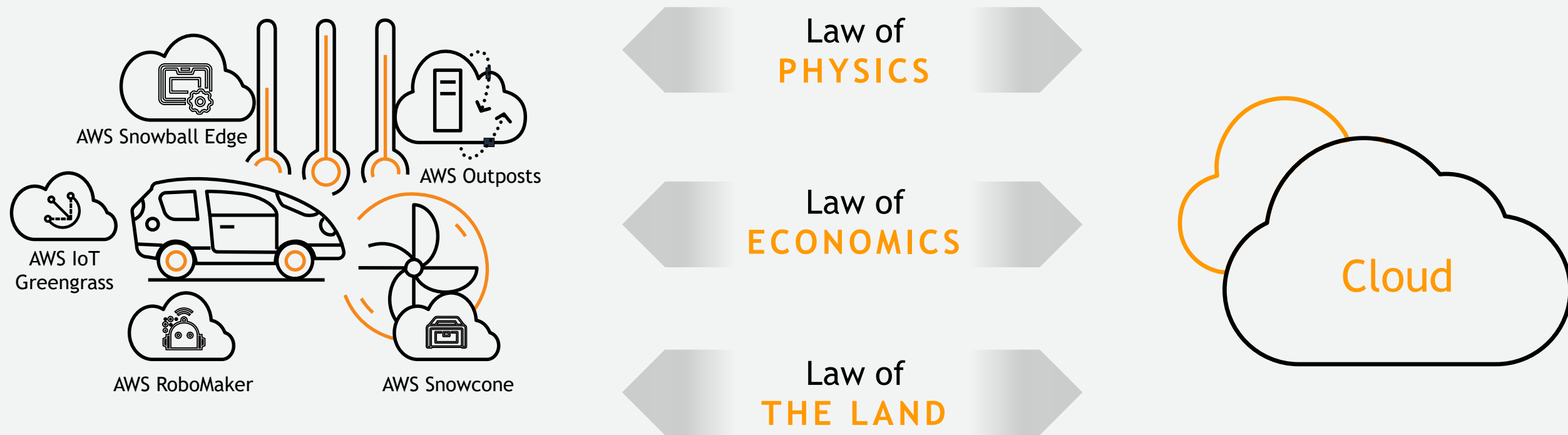
Computing at the Edge

Stefano Mallè, Head of Technology, AWS Switzerland

September 2021



Running workloads at the edge is challenging



Edge-to-cloud architecture

Microcontrollers
& IoT devices



Networked
environments



5G telco
networks



Rugged edge



On premises



Metro centers



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Metro centers



PoPs & Regions
(AWS Cloud)

25
Regions
(+7 announced)


**AWS Europe
(Zurich) Region
coming H2 2022**

81
Availability Zones
(+21 announced)

230+
PoPs

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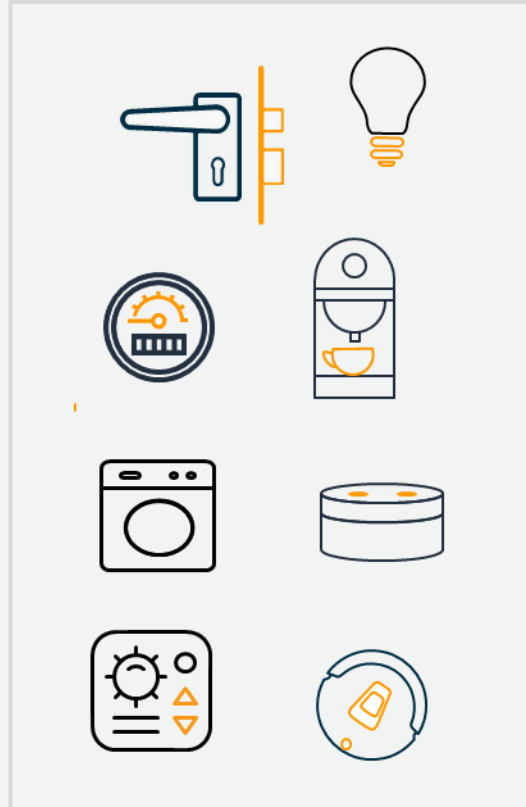
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IoT: FreeRTOS

Microcontrollers



**FreeRTOS
Kernel**

Real Time Operating
System (RTOS)



**Local
Connectivity**

Communicate with
AWS IoT Greengrass
devices without a
cloud connection



**Cloud
Connectivity**

Easily collect data &
take actions on
microcontroller
-based devices



Security

Secure device data
and connections



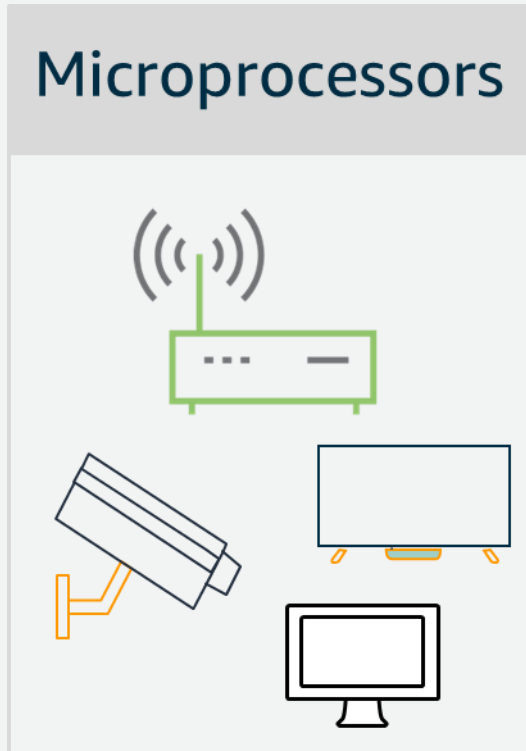
**OTA &
Code Signing**

Deploy security
updates, bug fixes, and
firmware updates to
devices in the field

FreeRTOS Long Term Support

IoT: AWS IoT Greengrass

Is an Internet of Things (IoT) open source edge runtime and cloud service that helps you build, deploy, and manage device software.



Security and
secrets manager



Local
messaging



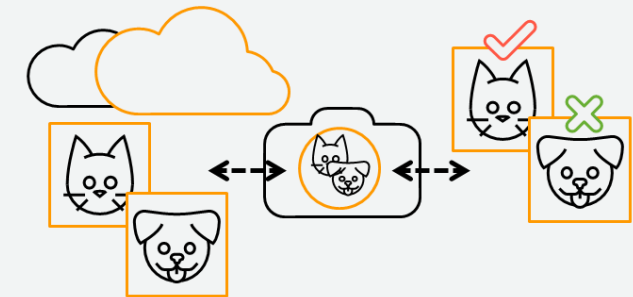
Local actions



Container support



Stream manager



ML inference

🏠 electronic caregiver

CHALLENGE

A large number of the world's population (100M+ in the U.S. alone) are living with a chronic disease. Yet managing health treatments and caregiving for aging individuals is particularly confusing and often unaffordable.

SOLUTION

Electronic Caregiver uses AWS services to deliver interactive & virtual caregiving support via intelligent, voice-activated devices. AWS IoT Core connects devices to the cloud to determine anomalous health readings, and AWS IoT Greengrass uses machine learning models built with Amazon SageMaker for local ML Inference and immediate actions at the edge. The personalized health & wellness monitoring, treatment support, and emergency responsiveness help ensure high-quality care without a human caregiver present.

IMPACT

With Electronic Caregiver's solution, seniors and others with chronic conditions are able to manage their health in-home for a fraction of the cost, giving these individuals and their loved ones peace of mind no matter where they are around the world.





CHALLENGE

Cradlewise makes smart cribs for babies from 0 to 24 months of age. The crib has critical requirements for being responsive with edge computing and also needs cloud infrastructure for complex, but less real time compute. Also, they needed to ensure parents would be able to connect to the crib reliably using mobile devices to control, monitor, and manage alerts from the crib.

SOLUTION

Cradlewise chose to use AWS IoT Greengrass and AWS IoT Core to ensure reliable remote and at-home connectivity between mobile devices and the crib. AWS IoT Greengrass keeps cribs operating even when internet is not available and helps in running and updating AWS Lambda functions.

IMPACT

AWS IoT provides a seamless way to handle edge and cloud computing as well as ensure reliable device connectivity. Cradlewise could therefore accelerate development of a secure smart-home product and get to market faster. Cradlewise through AWS IoT, is able to provide good sleep to babies and peace of mind to parents.



Machine Learning

Amazon Monitron



End-to-end equipment condition monitoring system, powered by machine learning, enabling predictive maintenance

AWS Lookout for Equipment



Detect abnormal machine behavior using existing industrial sensor data

AWS Panorama Appliance



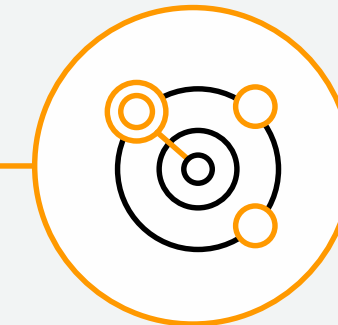
Turn existing onsite cameras into powerful edge devices

AWS Panorama Device SDK



Includes a device software stack for computer vision, sample code, APIs, and tools to test AWS Panorama Device software on hardware

AWS Lookout for Vision



Improved defect detection speed, consistency, and accuracy compared to manual inspection



**Cargill brings food and agricultural,
financial,
and industrial products
to people who need them
all around the world**

“**Computer vision helps us innovate and optimize several processes**, and the applications are endless. We want to use computer vision to assess the size of trucks coming to our granaries to determine the optimal loading dock for each truck. We also want to use computer vision to understand the movement of assets in our plants to remove bottlenecks.

AWS Panorama enables all of these solutions with a managed service and edge appliance for deploying and managing a variety of local computer vision applications.”

Victor Caldas
Computer Vision Capability Lead
Cargill

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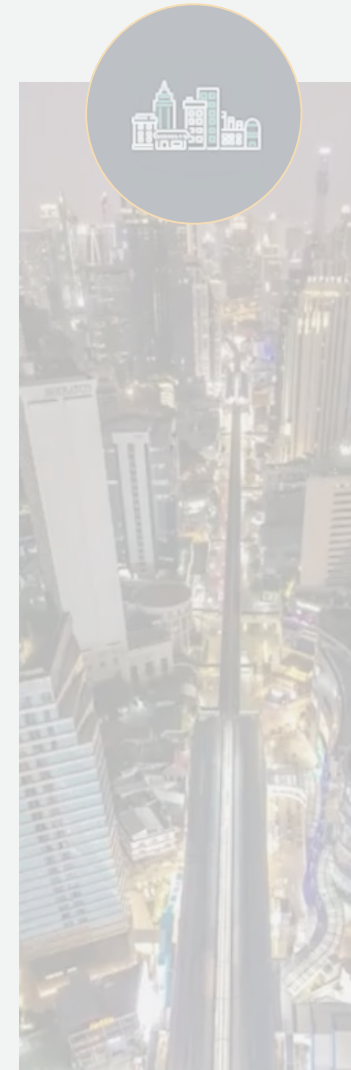
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A vertical panel with a dark grey background. At the top is a cloud icon in a circular icon. Below it is a network diagram icon. The text is centered and includes the number of regions, a specific region announcement with a Swiss flag icon, the number of availability zones, and the total number of PoPs.

AWS Snow Family

The rugged edge



Ghost Robotics



Company and platform

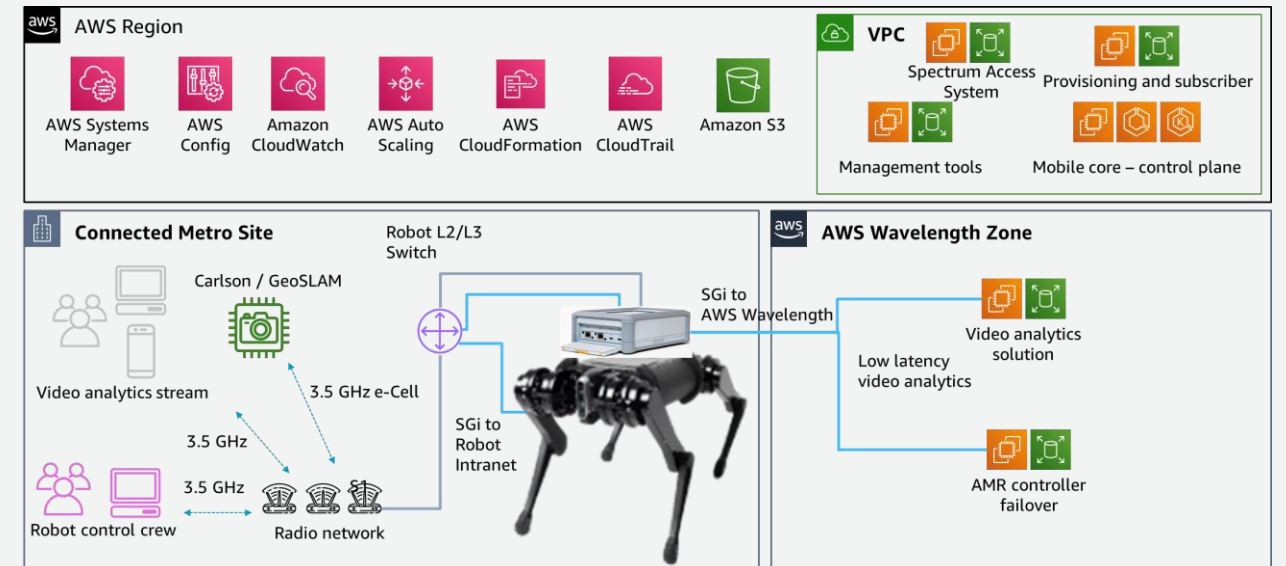
- Mobile IoT platform: sensors and comms
- High-availability, all-terrain, and open architecture
- Focus: military and homeland, and now enterprise
- Inspect, manage, and secure

Challenges and today's world

- Continuous coverage in remote / dangerous locations
- Worker safety
- Lack of human resources and expertise
- Data density and persistent comms

[Ghost Robotics Powers Next Gen Legged Robots with 5G at the Edge - YouTube](#)

[AWS re:Invent 2020: At the cutting edge: Dedicated edge networks and mobile edge cloud - YouTube](#)



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Infrastructure solutions: AWS Outposts



Extend AWS infrastructure and services on premises

AWS-designed, Nitro infrastructure for the same security and performance

Automatically managed and updated as part of AWS Regions

Single point of service and support

Build once, deploy anywhere

Run AWS Outposts in locations with limited space or capacity requirements - soon available in 2 new sizes: 1U and 2U



Customers want the same experience on premises and in the cloud

VOLKSWAGEN GROUP

Solution

One of the largest Industry 4.0 projects - **Digital Production Platform** - key lever to boost plant productivity by 30%

AWS is how

A **global platform** built using AWS IoT, combining data from machines, systems, and plants

Outcome

Production and supply chain use cases across 120+ plants

Costs savings of several billion euros expected

Integrating suppliers and partners worldwide

<https://aws.amazon.com/solutions/case-studies/volkswagen-group/>

Thank You!

