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# FREE Live Webinar

How to add connectivity to  
your IoT solution without  
worrying about operations  
– with AWS and EMnify

## Speakers



**Philipp Dreimann**  
Solutions Architect at  
Amazon Web Services



**Christian Henke**  
Head of Product  
EMnify





## EMnify IoT Webinars



GPS Tracking



Battery Technology



E-Scooters



Cloud Technology



Smart Modules



Smart Sensors



Industry



IoT Security

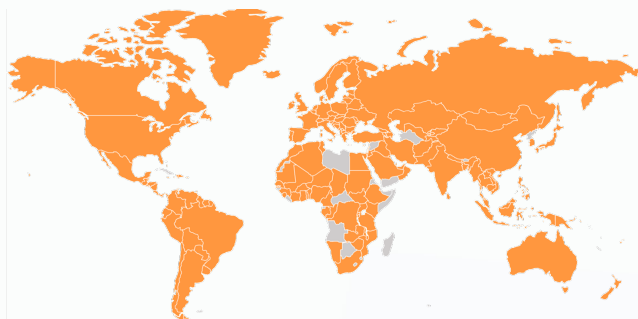


Smart Buildings



# Cellular IoT Connectivity Anywhere In The World

(2G, 3G, 4G, LTE-M, NB-IoT, 5G)



**180** countries

**540** networks



# IoT on AWS

without worrying about operations

Philipp Dreimann  
Solutions Architect, AWS



# AWS Global Infrastructure

24 geographical regions, 1 local region, 77 availability zones, 200+ POPs

## Region & Number of Availability Zones (AZs)

### GovCloud (US)

US-East (3), USWest (3)

### US West

Oregon (4)

Northern California (3)

### US East

N. Virginia (6), Ohio (3)

### Canada

Central (3)

### South America

São Paulo (3)

### Africa

Cape Town (3)

### Europe

Frankfurt (3), Paris (3),

Ireland (3), Stockholm (3),

London (3), Milan (3)

### Middle East

Bahrain (3)

### Asia Pacific

Singapore (3), Sydney (3),

Tokyo (4), Osaka-Local (1)\*

Seoul (4), Mumbai (3),

Hong Kong (3)

### China

Beijing (2), Ningxia (3)



## Announced Regions

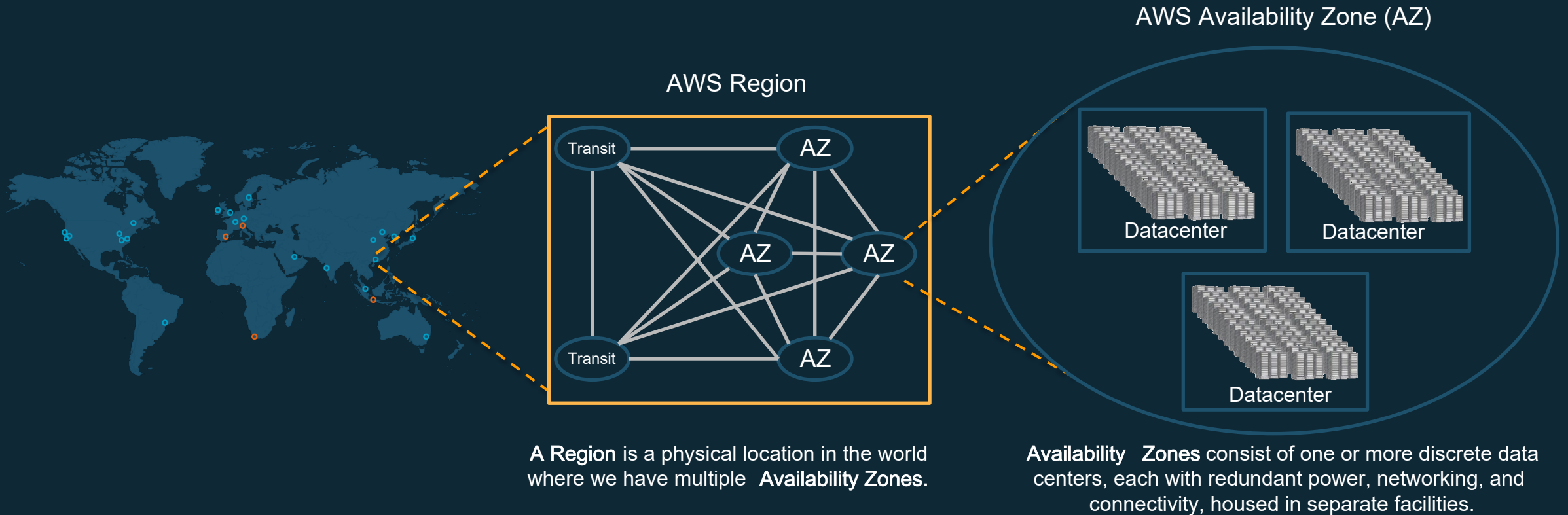
Three Regions and 9 AZs in Indonesia, Japan, and Spain

\* Available to select AWS customers who request access. Customers wishing to use the Asia Pacific (Osaka) Local Region should speak with their sales representative.








# AWS region design

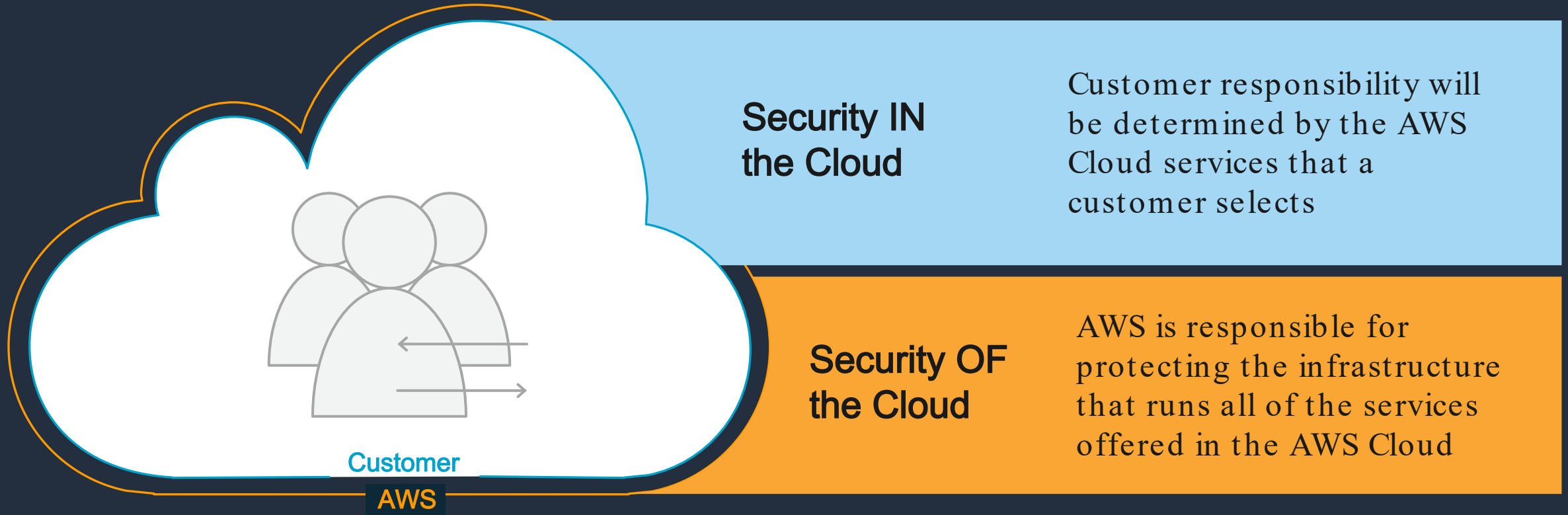
AWS Regions are comprised of multiple Availability Zones (AZs) for **high availability** , **high scalability** , and high **fault tolerance** . Applications and data are replicated in real time and consistent in the different AZs.



# Breadth and Depth of Services

|   |   |   |  |  |   |
|---|---|---|--|--|---|
|  <b>ANALYTICS</b><br><b>ANALYTICS</b><br>DATA EXCHANGE<br>DATA LAKE<br>DATA PIPELINES<br>DATA WAREHOUSE<br>ELASTICSEARCH<br><b>STREAMING</b><br>ETL<br>HADOOP/SPARK<br>INTERACTIVE SQL QUERIES<br>VISUALIZATIONS |  <b>COMPUTE</b><br><b>COMPUTE</b><br>AUTO SCALING<br>BATCH JOBS<br>EVENT-DRIVEN SERVERLESS COMPUTING<br>INSTANCE TYPES<br>MANAGED VIRTUAL PRIVATE SERVERS<br>MANAGED REPOSITORY FOR SERVERLESS APPS<br>RUN & MANAGE WEB APPS<br>SERVERLESS COMPUTE<br>VIRTUAL SERVERS<br><b>CONTAINERS</b><br>CONTAINER SERVICE<br>MANAGED KUBERNETES<br>STORE & RETRIEVE DOCKER IMAGES          |  <b>END USER COMPUTING</b><br>APP STREAMING<br>DESKTOP COMPUTING<br>MOBILE ACCESS<br>STORAGE & COLLABORATION   |  <b>MACHINE LEARNING</b><br><b>ML FRAMEWORKS</b><br>DEEP LEARNING AMIS & CONTAINERS<br>HARDWARE ACCELERATION<br>ML AT THE EDGE<br>TENSORFLOW, PYTORCH, MXNET<br><b>SAGEMAKER</b><br>AUTOMATIC MODEL TUNING<br>DATA LABELING<br>HOSTED NOTEBOOKS<br>ML MARKETPLACE<br>MODEL HOSTING<br>MODEL OPTIMIZATION<br>MODEL TRAINING<br>PRE-BUILT ALGORITHMS<br>TOPIC MODELING<br>DEEP LEARNING MODELS<br>REINFORCEMENT LEARNING<br>SPOT INSTANCES<br>BATCH PREDICTIONS<br>REAL-TIME PREDICTIONS<br><b>AI SERVICES</b><br>CHATBOTS<br>ENTITY EXTRACTION<br>FACE ANALYTICS<br>FACE SEARCH<br>FORECASTING<br>IMAGE LABELING<br>NATURAL LANGUAGE PROCESSING<br>PERSONALIZATION & RECOMMENDATION<br>SENTIMENT ANALYSIS<br>SPEECH TRANSCRIPTION<br>TEXT & DATA EXTRACTION<br>TEXT TO SPEECH<br>TRANSLATION<br>VIDEO & IMAGE ANALYSIS<br>CONTENT MODERATION |  <b>MEDIA SERVICES</b><br>LIVE VIDEO TRANSPORT<br>MEDIA STORAGE<br>TRANSCODING<br>VIDEO ORIGINATION & PACKAGING<br>VIDEO PERSONALIZATION & MONETIZATION<br>VIDEO PROCESSING & DELIVERY<br>VIDEO STREAMING ANALYSIS  |  <b>SATELLITE</b><br>SATELLITE OPERATIONS  |
|  <b>AR + VR</b><br>AR/VR EXPERIENCES   |   |  <b>HYBRID ARCHITECTURE</b><br>AWS SERVICES ON PREMISES<br>DATA INTEGRATION<br>INTEGRATED DEVICES & EDGE SYSTEMS<br>INTEGRATED IDENTITY & ACCESS<br>INTEGRATED NETWORKING<br>INTEGRATED RESOURCE & DEPLOYMENT MANAGEMENT<br>VMWARE CLOUD ON AWS                |  |  <b>MIGRATION &amp; TRANSFER</b><br>APPLICATION MIGRATION<br>DATABASE MIGRATION<br>EXABYTE-SCALE MIGRATION<br>ONLINE DATA TRANSFER<br>SCHEMA CONVERSION<br>SERVER MIGRATION<br>TRANSFER FOR SFTP  |  <b>SECURITY, IDENTITY, &amp; COMPLIANCE</b><br>ACCESS CONTROL<br>ASSESSMENT & REPORTING<br>CONFIGURATION COMPLIANCE<br>DATA PROTECTION<br>DDOS PROTECTION<br>IDENTITY MANAGEMENT<br>KEY MANAGEMENT & STORAGE<br>MONITORING & LOGGING<br>RESOURCE MANAGEMENT<br>THREAT DETECTION<br>WEB APPLICATION FIREWALL |
|  <b>AWS COST MANAGEMENT</b><br>ANALYZE AWS COSTS<br>COST & USAGE BUDGETS<br>COST & USAGE REPORTS<br>RESERVED INSTANCES REPORTING   |   |  <b>GAME TECH</b><br>CROSS-PLATFORM 3D GAME ENGINE<br>GAME SERVER HOSTING  |  |  <b>MOBILE</b><br>API GATEWAY<br>DEVELOPMENT FRAMEWORK<br>IDENTITY<br>MOBILE ANALYTICS<br>MOBILE APP TESTING<br>SINGLE INTEGRATED CONSOLE<br>SYNC<br>TARGETED PUSH NOTIFICATIONS  |  <b>STORAGE</b><br>ARCHIVE STORAGE<br>BACKUP & RESTORE<br>BLOCK STORAGE<br>DATA TRANSFER<br>EDGE PROCESSING & COMPUTING<br>FILE STORAGE<br>HIGH-PERFORMANCE FILE SYSTEM<br>HYBRID CLOUD STORAGE<br>OBJECT STORAGE<br>WINDOWS FILE SYSTEM   |
|  <b>APPLICATION INTEGRATION</b><br>EMAIL<br>MESSAGE BROKER<br>QUEUEING & NOTIFICATIONS<br>SEARCH<br>TRANSCODING<br>WORKFLOW  |  <b>DATABASE</b><br><b>REALTIONAL DATABASES</b><br>HIGH-PERFORMANCE RELATIONAL DATABASE BUILT FOR THE CLOUD<br>MANAGED MARIADB<br>MANAGED MYSQL<br>MANAGED ORACLE<br>MANAGED POSTGRES<br>MANAGED SQL SERVER<br><b>PURPOSE-BUILT DATABASES</b><br>DOCUMENT DATABASE<br>GRAPH DATABASE<br>IN-MEMORY CACHING<br>KEY-VALUE STORE DATABASE<br>LEDGER DATABASE<br>TIME SERIES DATABASE |  <b>INFRASTRUCTURE</b><br>AVAILABILITY ZONES<br>CUSTOM HARDWARE<br>DATA CENTER INFRASTRUCTURE<br>GLOBAL NETWORK BACKBONE<br>POINTS OF PRESENCE<br>POWER INFRASTRUCTURE<br>REGIONS  |  <b>MANAGEMENT &amp; GOVERNANCE</b><br>ACTIVITY & API USAGE TRACKING<br>CHATBOT CONFIGURATION TRACKING<br>GOVERNANCE<br>INVENTORY TRACKING<br>LICENSE MANAGER<br>MANAGE POLICIES<br>MANAGE RESOURCES<br>MONITORING<br>PROVISIONING<br>RESOURCE TEMPLATES<br>SECURITY RECOMMENDATIONS<br>SERVER MANAGEMENT<br>SERVICE CATALOG<br>SYSTEMS MANAGER   |  <b>NETWORKING &amp; CONTENT DELIVERY</b><br>APPLICATION DELIVERY<br>DEDICATED NETWORK CONNECTION<br>DOMAIN NAME SYSTEM<br>LOAD BALANCING<br>MONITOR APIS<br>MONITOR MICROSERVICES<br>NETWORK TOPOLOGY<br>NETWORKING HUB<br>PRIVATE CONNECTION TO APPS<br>SCALE VPC & ACCOUNT CONNECTIONS<br>SERVICE DISCOVERY<br>VIRTUAL PRIVATE CLOUD |  <b>CUSTOMER ENABLEMENT</b><br>ACCOUNT MANAGEMENT<br>DASHBOARD PERSONALIZATION<br>ENTERPRISE SUPPORT<br>EXPERTS MARKETPLACE<br>OPTIMIZATION GUIDANCE<br>PARTNER ECOSYSTEMS<br>PROFESSIONAL SERVICES<br>SECURITY & BILLING REPORTS<br>SOLUTIONS MANAGEMENT<br>TRAINING & CERTIFICATION                        |
|  <b>BUSINESS APPLICATIONS</b><br>EMAIL & CALENDARING<br>ONLINE MEETINGS<br>SHARING & COLLABORATION<br>UNIFIED COMMUNICATIONS<br>VOICE-ENABLED WORKPLACE  |   |  <b>DEVELOPER TOOLS</b><br>ANALYZE & DEBUG<br>APPLICATION LIFECYCLE MANAGEMENT<br>AUTHORIZING<br>BUILD & TEST<br>CONTAINERS<br>DEVOPS RESOURCE MANAGEMENT<br>ONE-CLICK APP DEVELOPMENT<br>PATCHING<br>PIPELINE ORCHESTRATION<br>RESOURCE TEMPLATES<br>TRIGGERS |  <b>INTERNET OF THINGS (IOT)</b><br>RULES ENGINE<br>DEVICE ANALYTICS<br>DEVICE GATEWAY<br>DEVICE SDK<br>DEVICE SHADOWS<br>EVENT DETECTION & RESPONSE<br>LOCAL COMPUTE<br>LOCAL DATA COLLECTION<br>MANAGEMENT & SECURITY<br>MICROCONTROLLER OPERATING SYSTEM<br>REGISTRY<br>VISUAL APPLICATIONS DEVELOPMENT  |  <b>MARKETPLACE</b><br>ANALYTICS<br>DATA PRODUCTS<br>DATABASES<br>DEVOPS<br>IOT<br>MACHINE LEARNING<br>NETWORKING<br>OPERATING SYSTEMS<br>SECURITY<br>STORAGE   |  <b>ROBOTICS</b><br>CLOUD ROBOTICS   |
|  <b>BLOCKCHAIN</b><br>BLOCKCHAIN TEMPLATES<br>LEDGER DATABASE<br>MANAGED BLOCKCHAIN  |   |   |  |  |   |
|  <b>CUSTOMER ENGAGEMENT</b><br>CONTACT CENTER<br>EMAIL TARGETING<br>USER ENGAGEMENT ACROSS CHANNELS  |   |   |  |  |   |

# Shared responsibility model





# Inherit global security and compliance controls

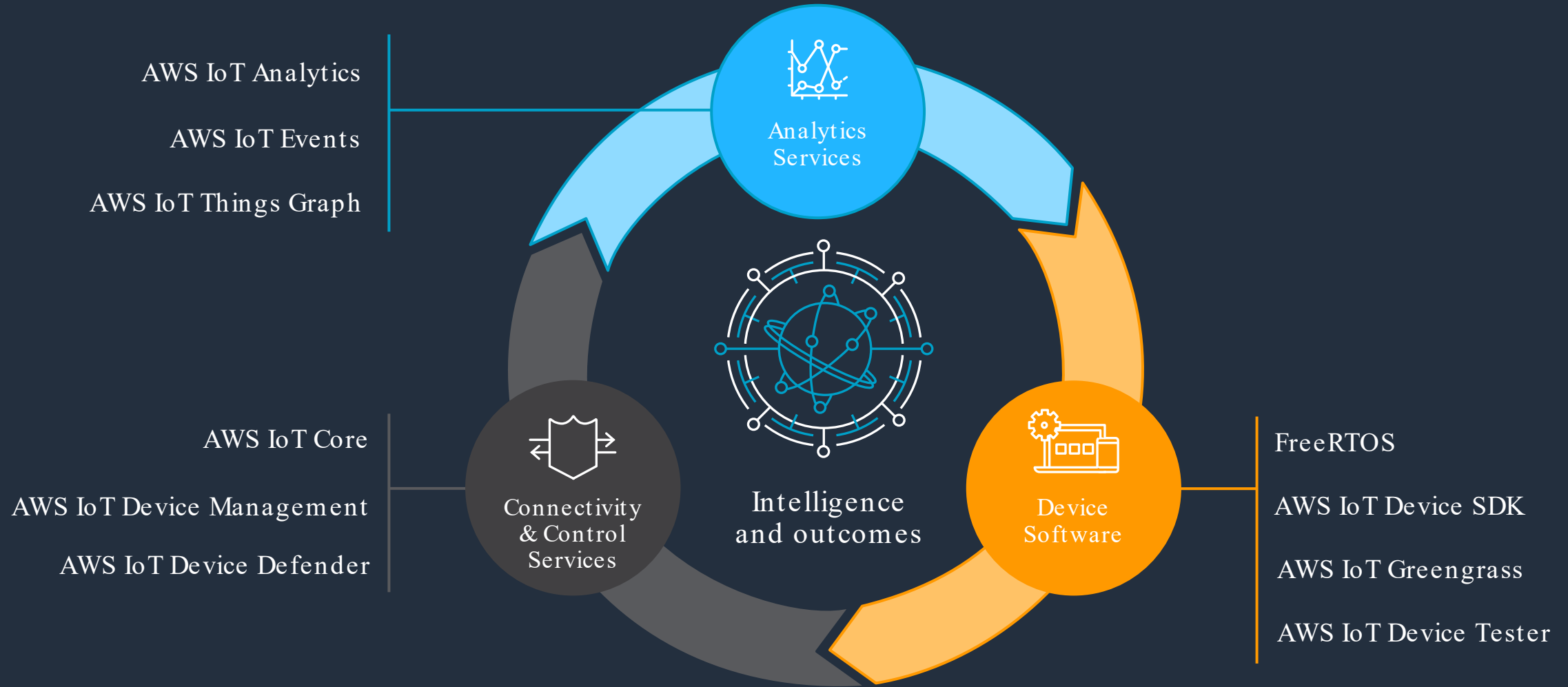


# Now, really: IoT on AWS

# AWS IoT customers solve problems in all sectors



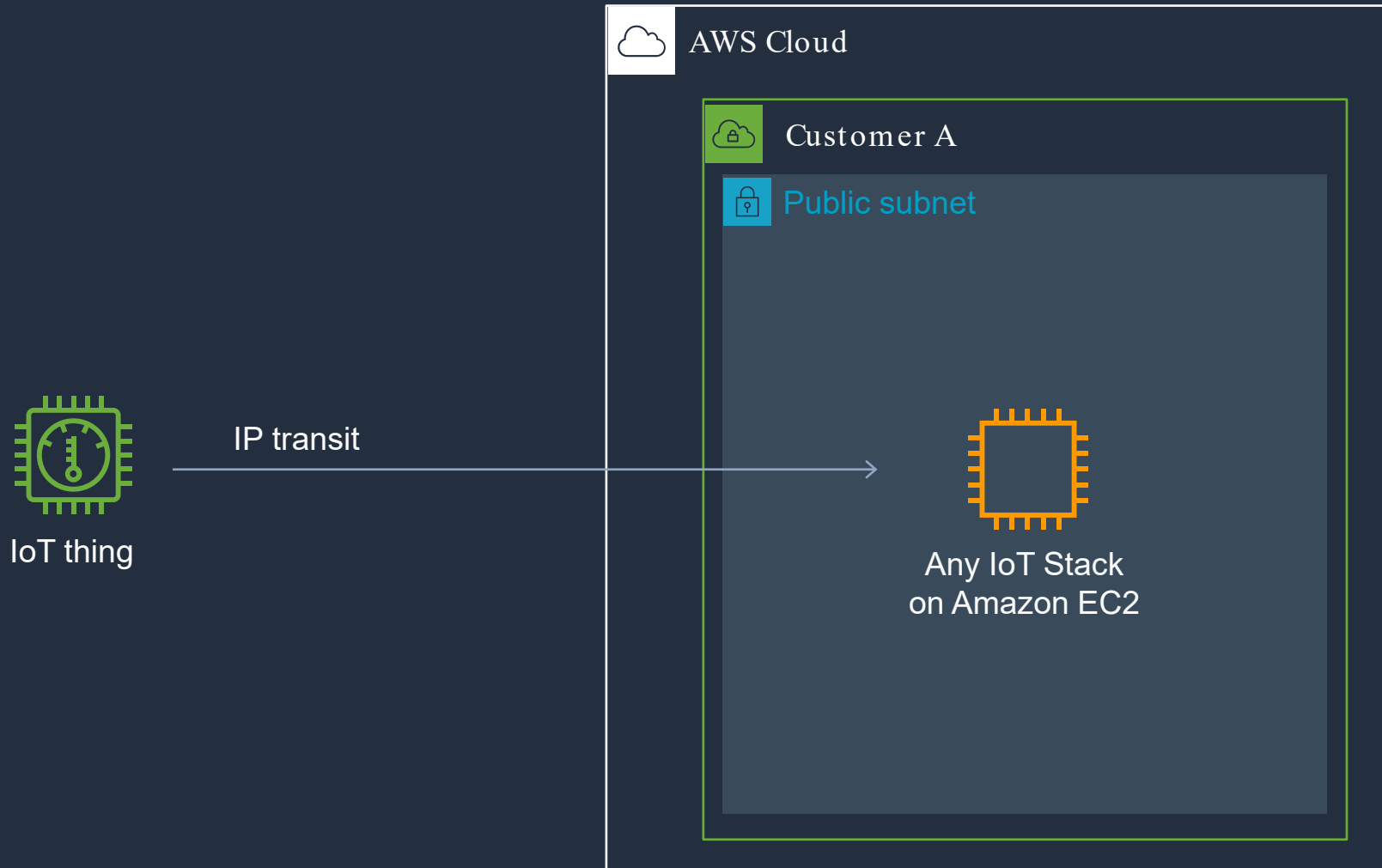
# Device to business value



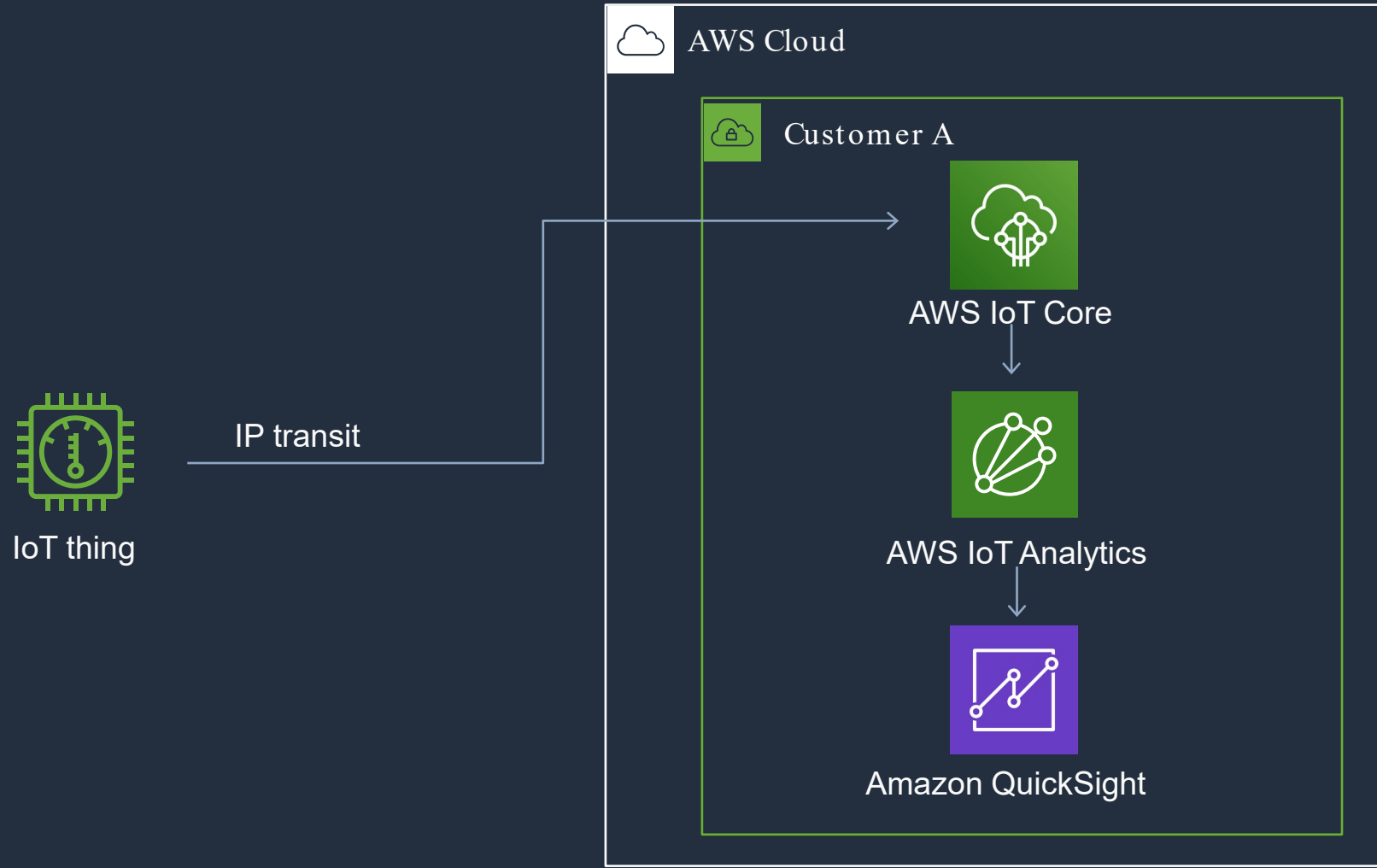


# How to get started?

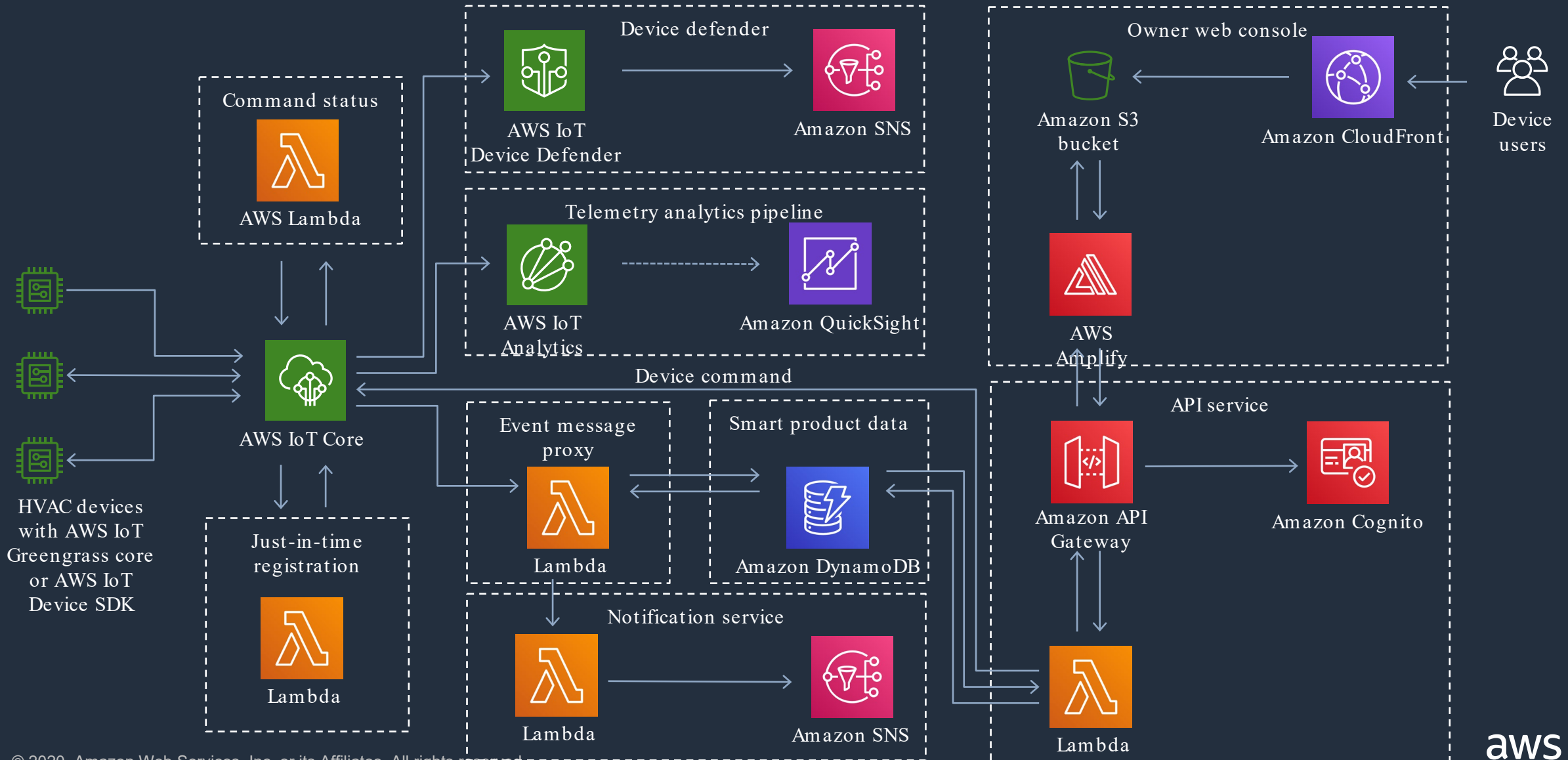
# Any IoT Stack on AWS



# Usage of AWS IoT Core



# How to start? Smart product solution





# AWS and Cellular Connectivity for IoT

# Distributed IoT Architecture

- Why required in IoT B2B?
  - data loss / latency
  - keep the customer data locally where the device is
  - battery / power saving
  - service uptime / redundancy
- Why AWS?
  - one contract – one infrastructure
  - redundancy, availability
  - scalable infrastructure
  - PAYG model
  - Specialized IoT services
    - device management, shadow and secure authentication (AWS IoT Core)
    - DNS load-balancing service (AWS Route 53) between the different geographical locations



**With AWS IoT or EC2**

# Distributed Cellular IoT with AWS IoT Core and EMnify

## Traditional Operators



Home-routing of roaming SIM data  
prevents distributed architecture

**Works also  
with AWS  
EC2**

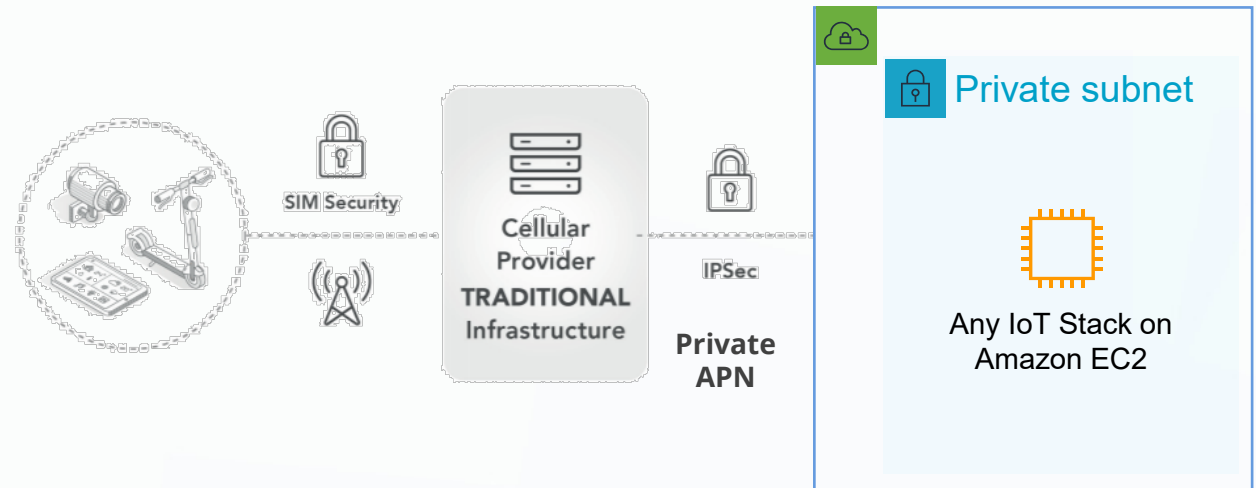
## EMnify Connectivity



EMnify mobile core network is  
deployed in major AWS regions –  
keeping data local

# Secure Private Network for Cellular IoT

- Why required in IoT B2B?
  - remote access for support teams
  - additional security layer
  - circumvent carrier grade NAT
- Why AWS
  - high availability with managed service for VPN/IPsec or intra-cloud AWS TGW
  - support latest encryption standards
  - automated and standardized secure setup

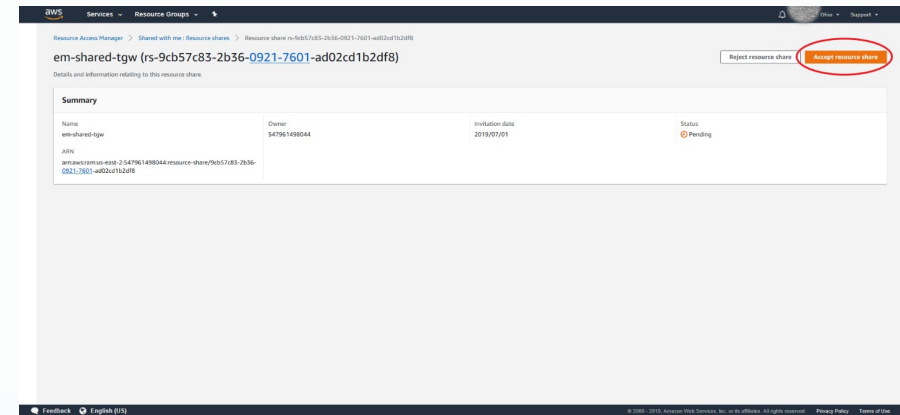
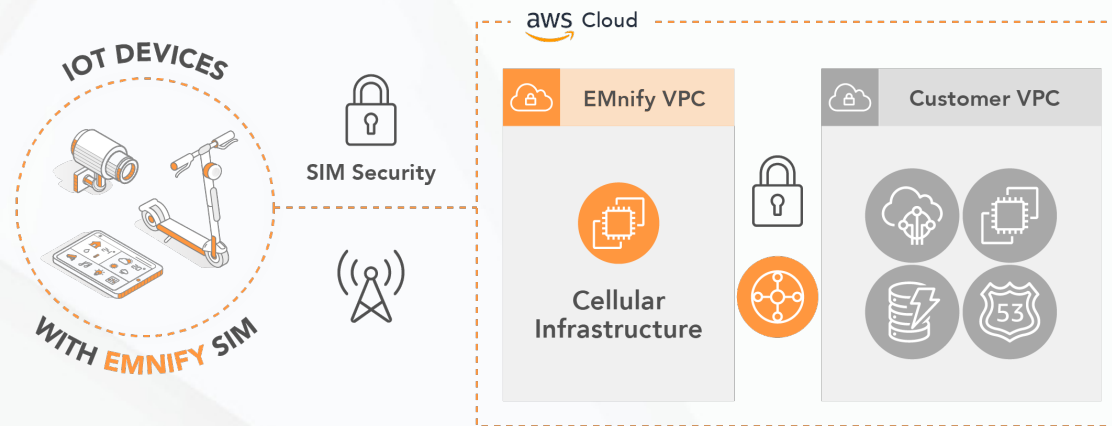


## Drawbacks:

- Setup and recurring costs (private APN, static IP, IPsec, Radius)
- complex IP config to setup redundant tunnels over public internet
- Time to deliver: 2-6 weeks



# Simplifying Private Networks with EMnify and AWS



- EMnify secures data up to AWS
- Establishing private network with AWS Transit Gateway attachment (intra-cloud connect) via cross account role in minutes
- No need for private APN, IPsec

# Operational Data, Alerts and Dashboards

- Why required in IoT B2B?

- support teams' primary tools
- solve issues before they appear
- display relevant data from all data sources for root cause triage

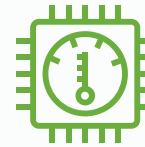
- Why AWS?

- streaming analytics and storage as a service
- scales with needs without pre-provisioning
- Integrates device and infrastructure data
- Or use own developed application on top of datastore (e.g. DynamoDB)

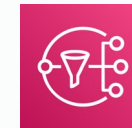


AWS IoT  
Device Defender

Detect anomalies



Thing

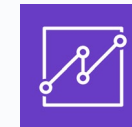


Amazon SNS

Send alerts



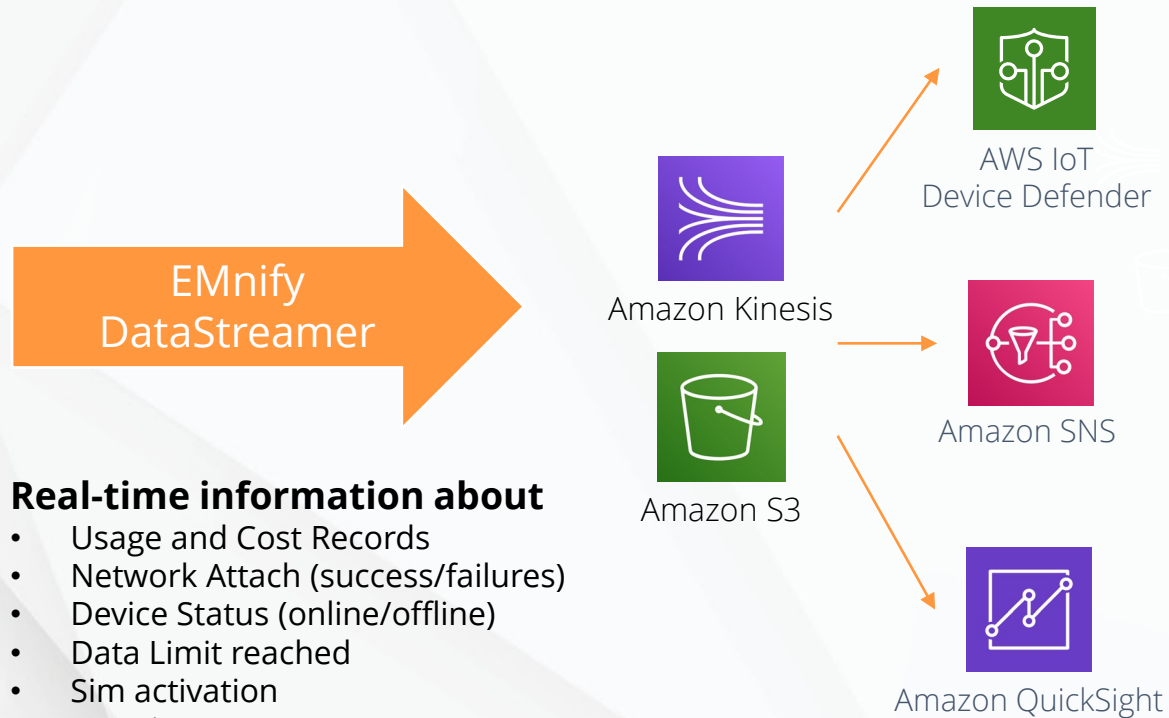
EC2 with  
Cloudwatch



Amazon QuickSight

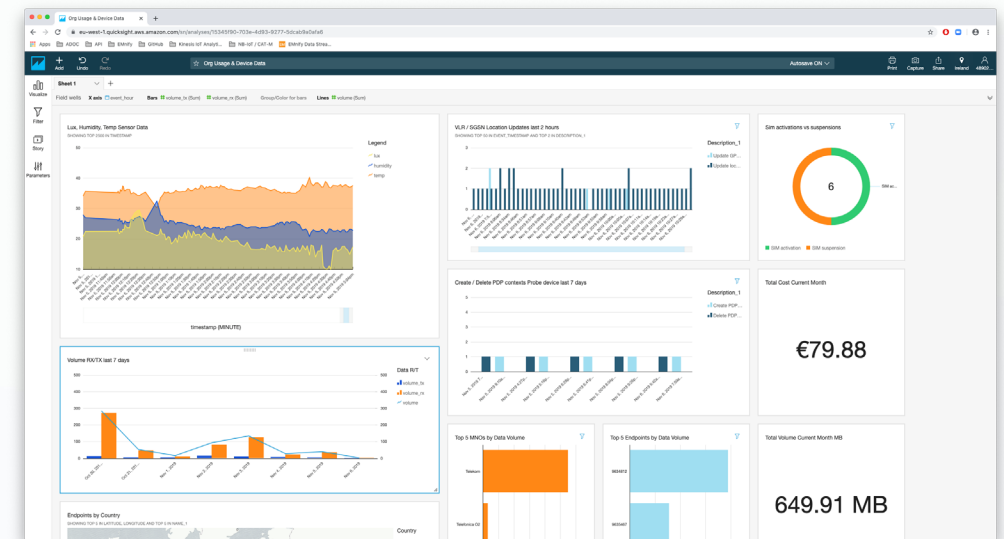
No-code  
dashboards

# Integrating Connectivity Data with EMnify and AWS



## Real-time information about

- Usage and Cost Records
- Network Attach (success/failures)
- Device Status (online/offline)
- Data Limit reached
- Sim activation
- Location
- ...



Example AWS QuickSight Dashboard with Device and connectivity data

# Summary

Customer  
requirements



**EMnify**

IoT solution  
that works  
everywhere

Reliable  
Distributed  
Infrastructure

Global Cellular  
Connectivity and  
multi-region  
mobile network

With efficient  
utilization of  
resources

Managed Services  
offloads  
development and  
operation

Automated  
Integration into  
AWS Cloud

Support teams  
that can see and  
solve customer  
issues

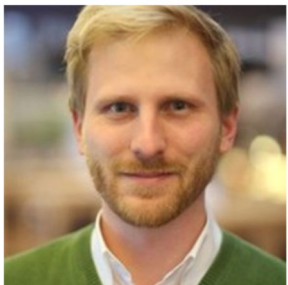
Services to  
operate, display,  
alert on the  
solution

Connectivity  
Metadata in AWS  
and remote device  
access



# How to get started

- Getting Started with AWS  
<https://amzn.to/3hZSkKj>
- Learn about AWS IoT  
<https://aws.amazon.com/iot>
- Smart Product Solution  
<https://amzn.to/2G7aaxq>



**pdreiman@amazon.de**

- EMnify Cellular IoT on AWS  
<https://www.emnify.com/aws-service>
- Start testing for free  
<https://cdn.emnify.net/#/signup>



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