



Connecting the Unconnected: IoT Made Simple

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 @danilop

 danilop


The background features a dark gray grid of thin lines forming a pattern of small squares. Overlaid on this grid are several wavy, light gray lines that create a sense of motion and depth, resembling a stylized wave or a data visualization. The overall aesthetic is modern and technological.

Internet of Things

The background features a dark grey grid pattern. Overlaid on this is a series of wavy, light grey lines that create a sense of motion and depth, resembling a stylized wave or a data visualization. The text is centered over this graphic.

Internet of Things
Why there is so much interest?

**Smarter Products
That Get Better
with Time**

A dark grey background with a subtle, repeating diamond-shaped grid pattern. On the left side, there is a white graphic element consisting of a horizontal line that extends from the left edge towards the center, and a vertical line that extends upwards from the end of the horizontal line. At the intersection of these two lines, there is a small, solid white circle.

All the music on earth, in every room of your home, wirelessly

Sonos

Sonos is the smart speaker system that streams all your favorite music to any room, or every room.

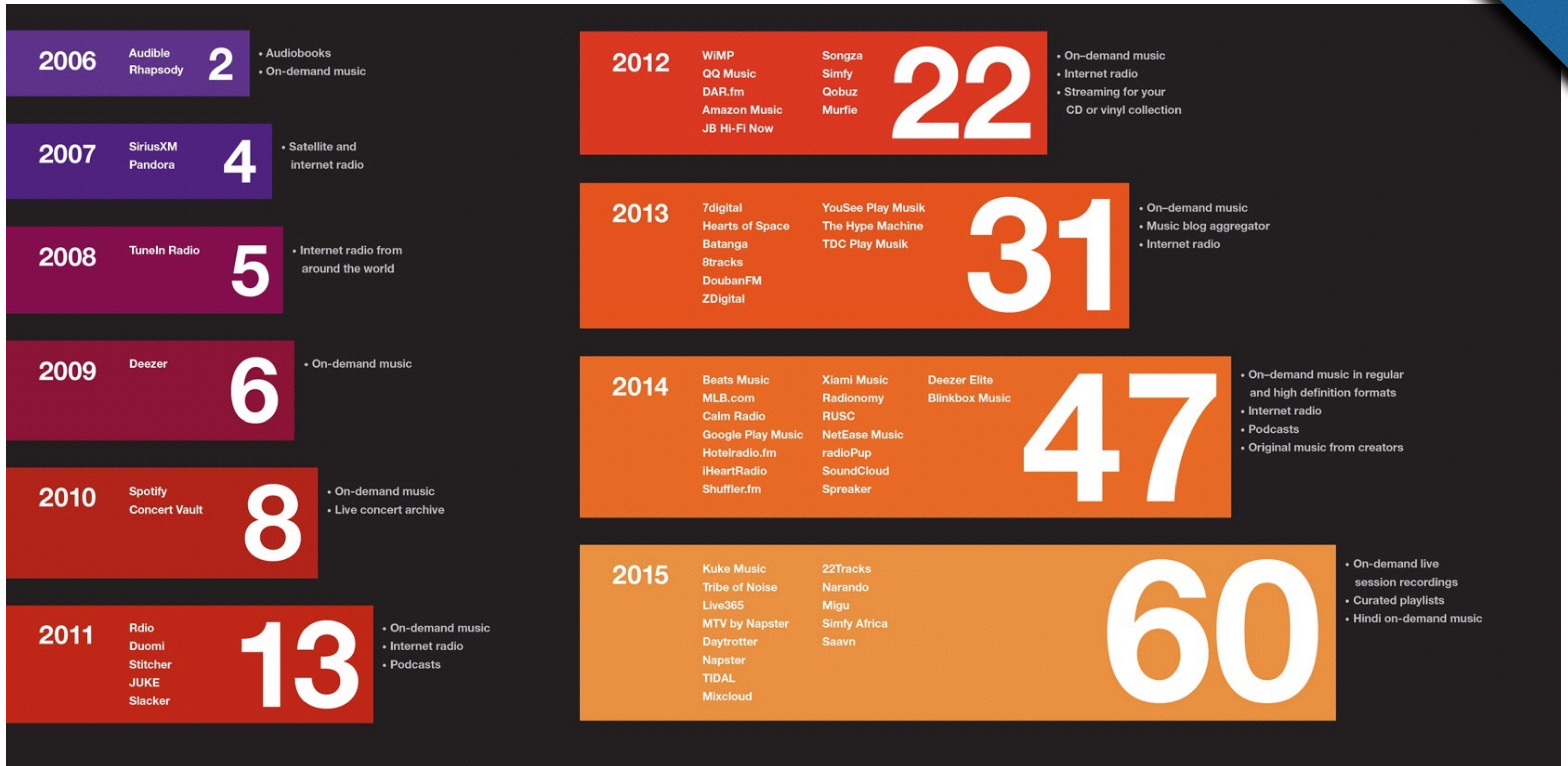
Control your music with one simple app, and fill your home with pure, immersive sound.



SONOS

Connected products *improve* over time

Sonos



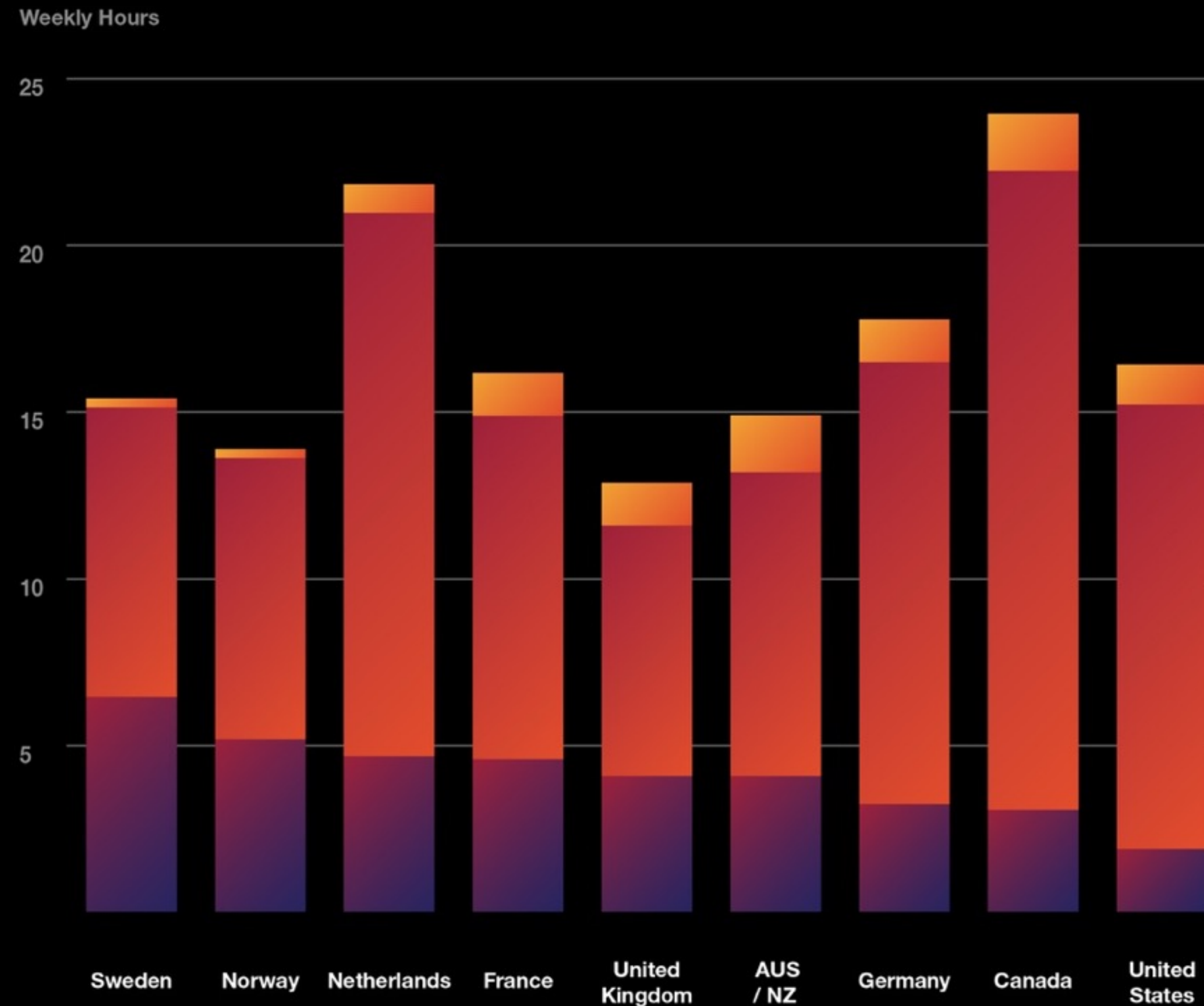
Connected products provide *unique* insights

Sonos

92% of all listening on Sonos is streaming music.

- Private Library
- Free Radio
- Paid On-Demand

Source:
Average weekly listening hours on Sonos in May 2015 among opt-in households (~60%; varies by country). Measures 60+ music sources globally including free radio (e.g. Pandora, TuneIn, Songza), paid on-demand (e.g. Spotify, Tidal, Google Play Music, Deezer), and personal libraries (e.g. iTunes, digital downloads, ripped files).



**Smarter Products
That Get Better
with Time**

**Processes That Are
More Efficient
and Predictable**

More Data

More Data



More Knowledge

**Smarter Products
That Get Better
with Time**

**Processes That Are
More Efficient
and Predictable**

**Closer
Relationship with
Your Customers**

Closer Feedback

Closer Feedback



Agile Methodology

**Smarter Products
That Get Better
with Time**

**Processes That Are
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**Closer
Relationship with
Your Customers**

**Offerings
That Were
Not Possible Before**



We are enabling
the transformation
of healthcare to
a networked,
patient-centric model

HealthSuite digital platform



Clinical informatics



Care coordination



Patient engagement



HealthSuite
digital platform
Open and cloud based

Population health analytics

Data sources



EMR



Digital pathology



PACS



Patient monitor



MRI



Genomics



Labs (LIS)



Ventilator



GoSafe

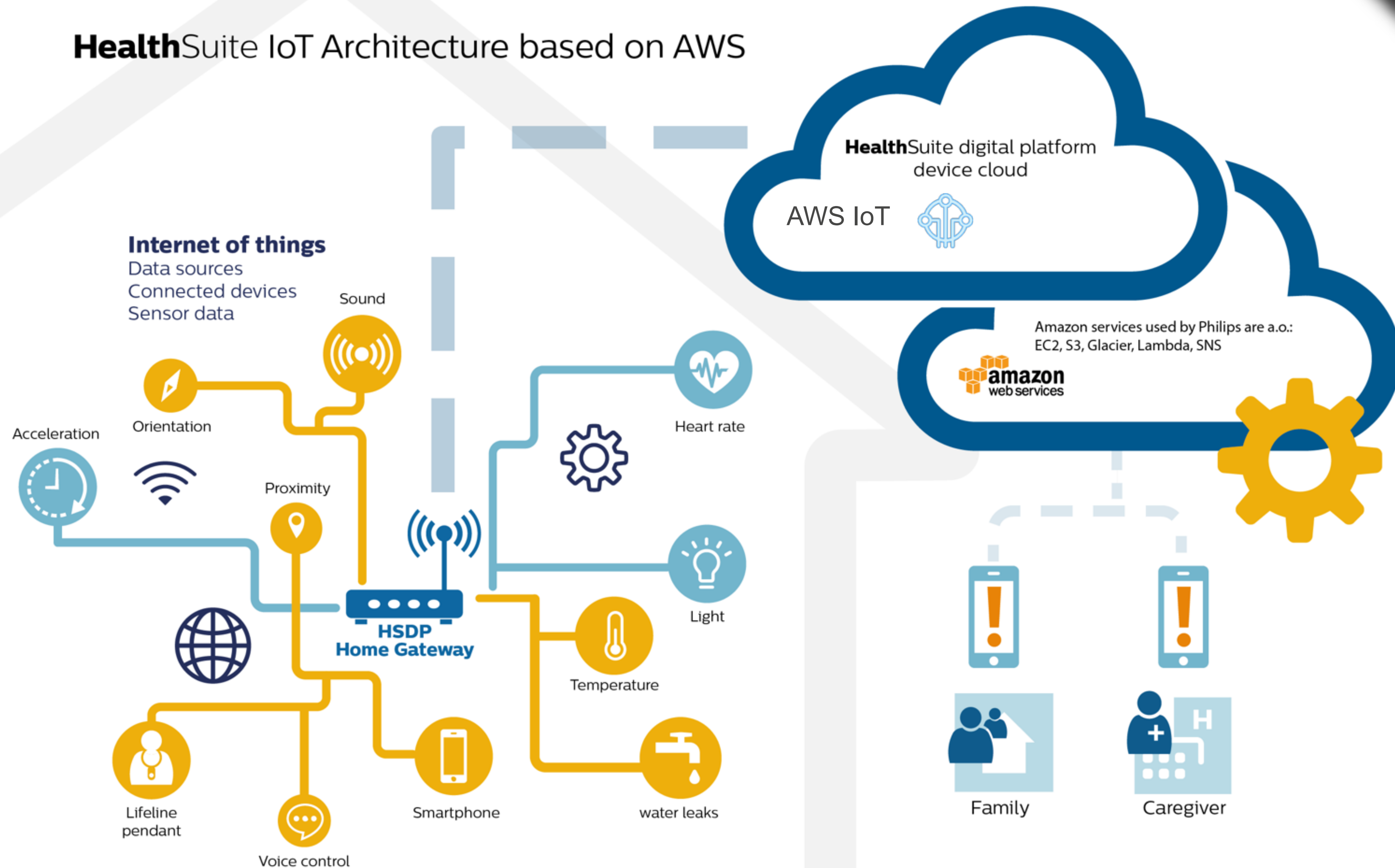


Scale



Blood pressure

HealthSuite IoT Architecture based on AWS



**Smarter Products
That Get Better
with Time**

**Processes That Are
More Efficient
and Predictable**

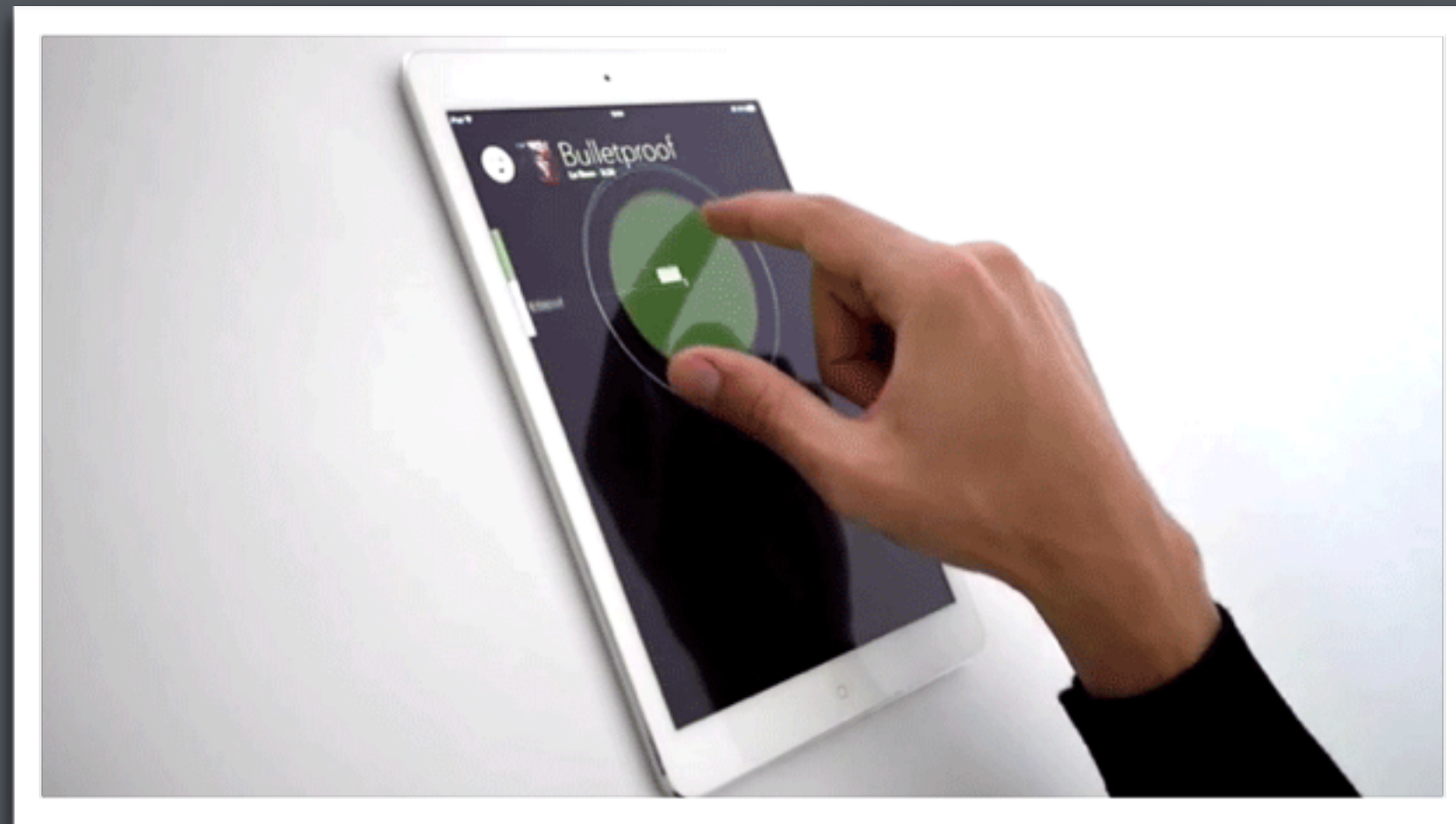
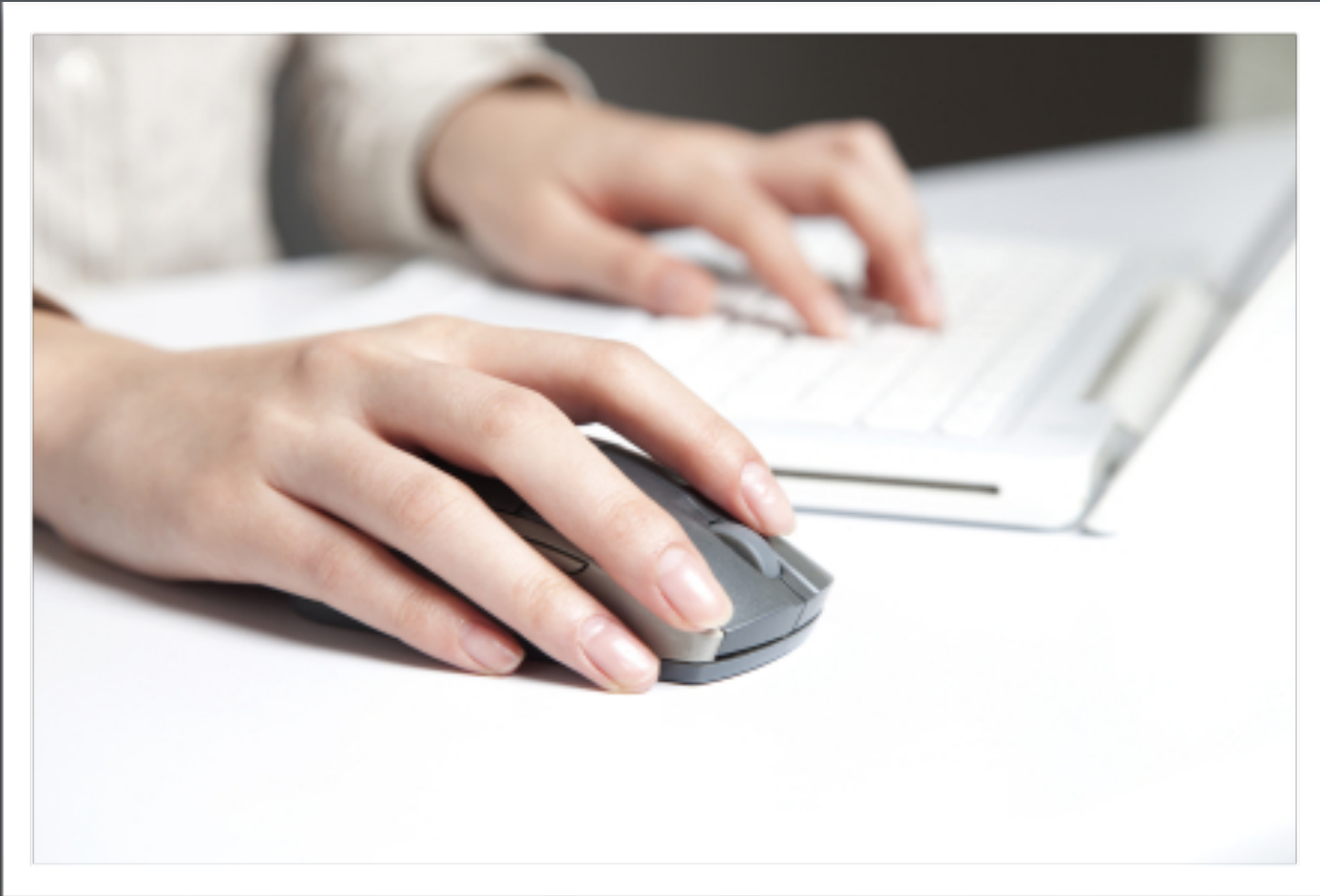
**Closer
Relationship with
Your Customers**

**Offerings
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Not Possible Before**

Product Interface

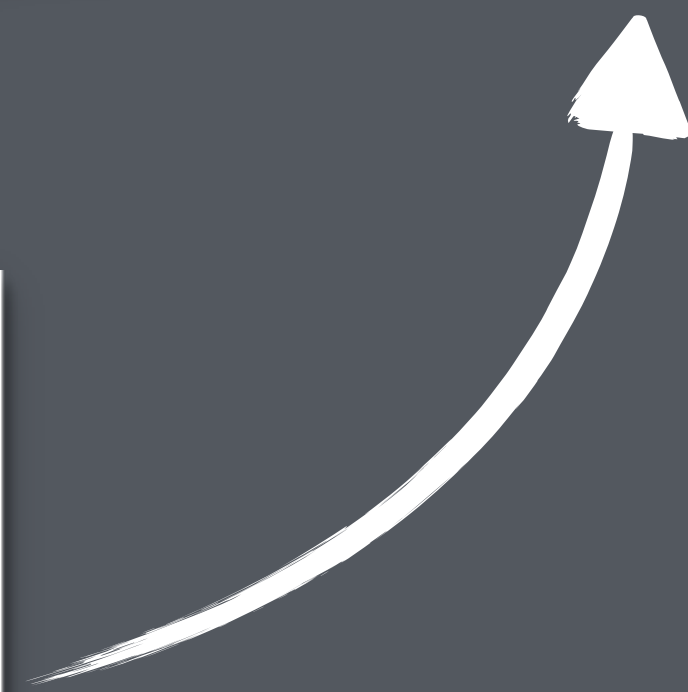
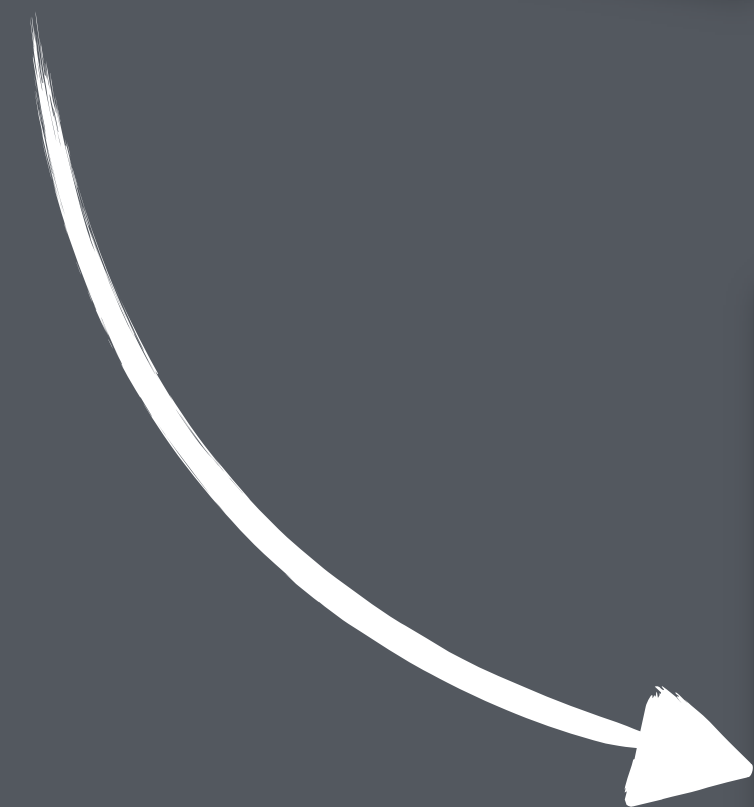
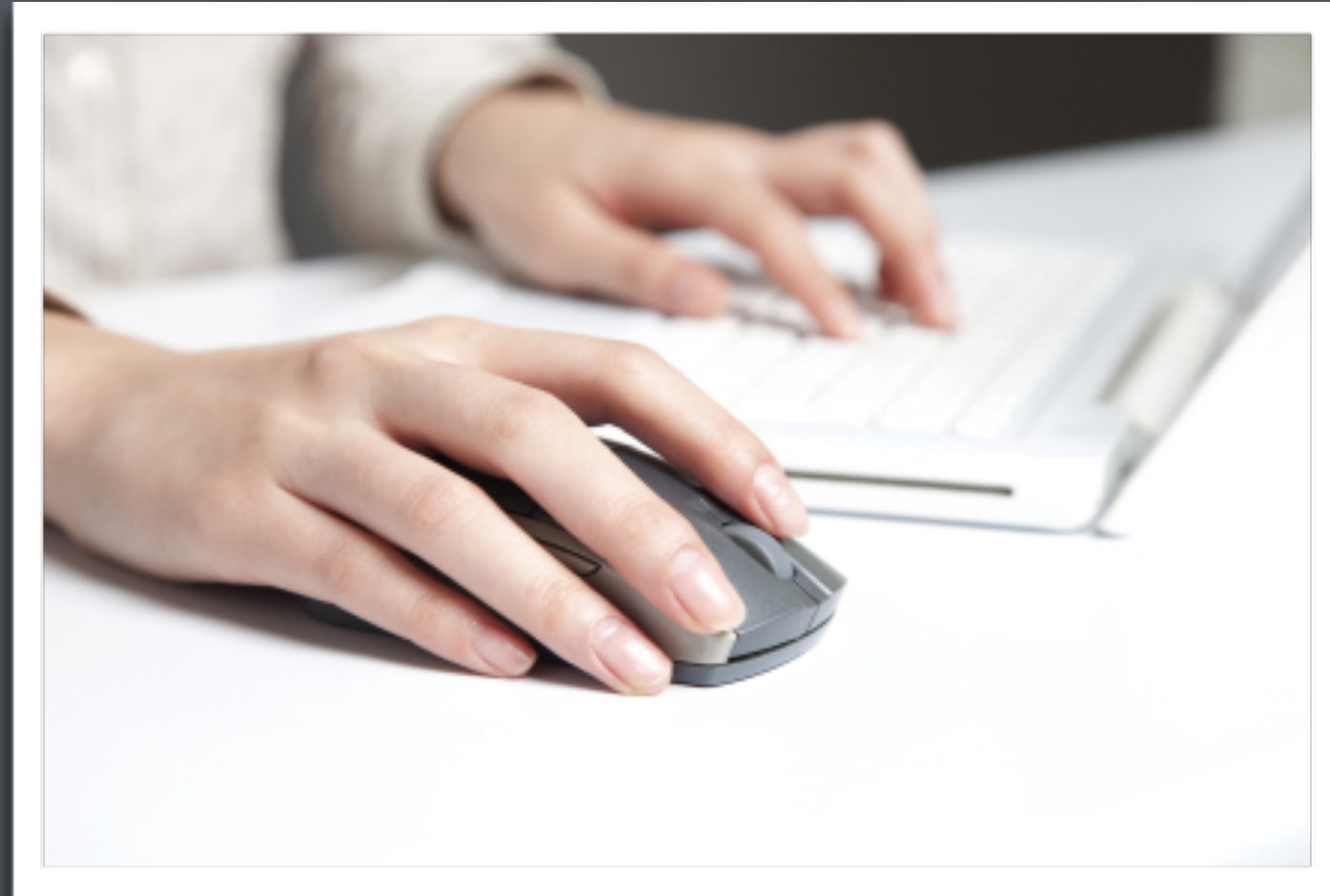


Mediated Interface



**Simulated
Interface**

Direct Interface





**The Product is
The Interface**

Communication Happens Naturally



**The Product is
The Interface**

Communication Happens Naturally



“Thank You”

“Goodbye”

Communication Happens Naturally




**Alexa Voice Service
(AVS)**

**Alexa Skills Kit
(ASK)**

A Lot of Efforts Are Still Required...

Devices Are Hard to Connect, Manage

A decorative graphic consisting of a horizontal red line extending from the left edge of the slide to a red dot, and a vertical red line extending upwards from that dot.

**Devices
Are Hard to
Connect, Manage**

**Things
Do Not Interoperate
Out of The Box**

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**Low
Signal to Noise Ratio
in Collected Data**

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**Applications
and Things
Do Not Always Match**

**Telemetry
Devices**

M2M

Applications

Web

RESTful



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Signal to Noise Ratio
in Collected Data**

**Applications
and Things
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How to make IoT Simple ?

How to make IoT Simple ?
For Developers



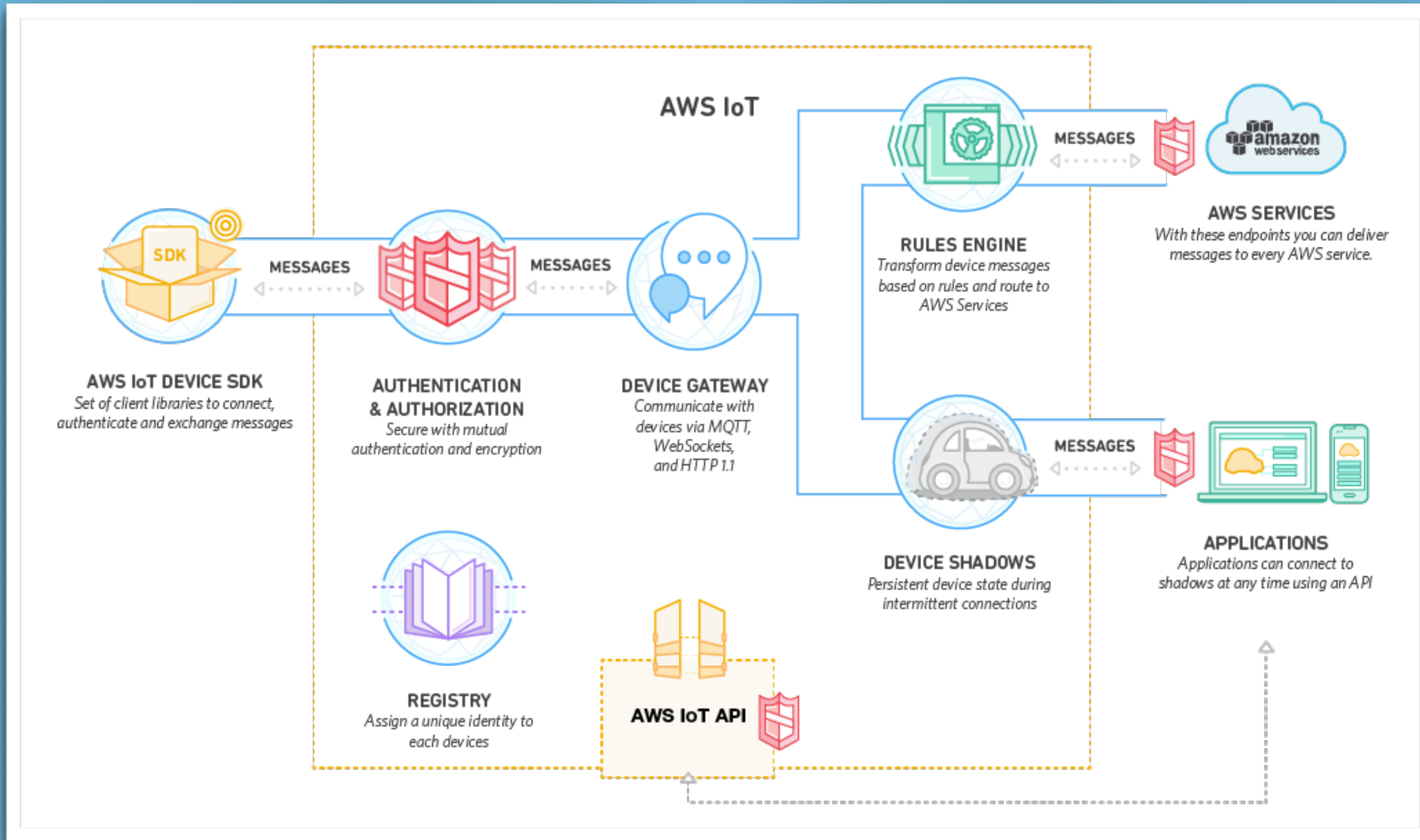
Security



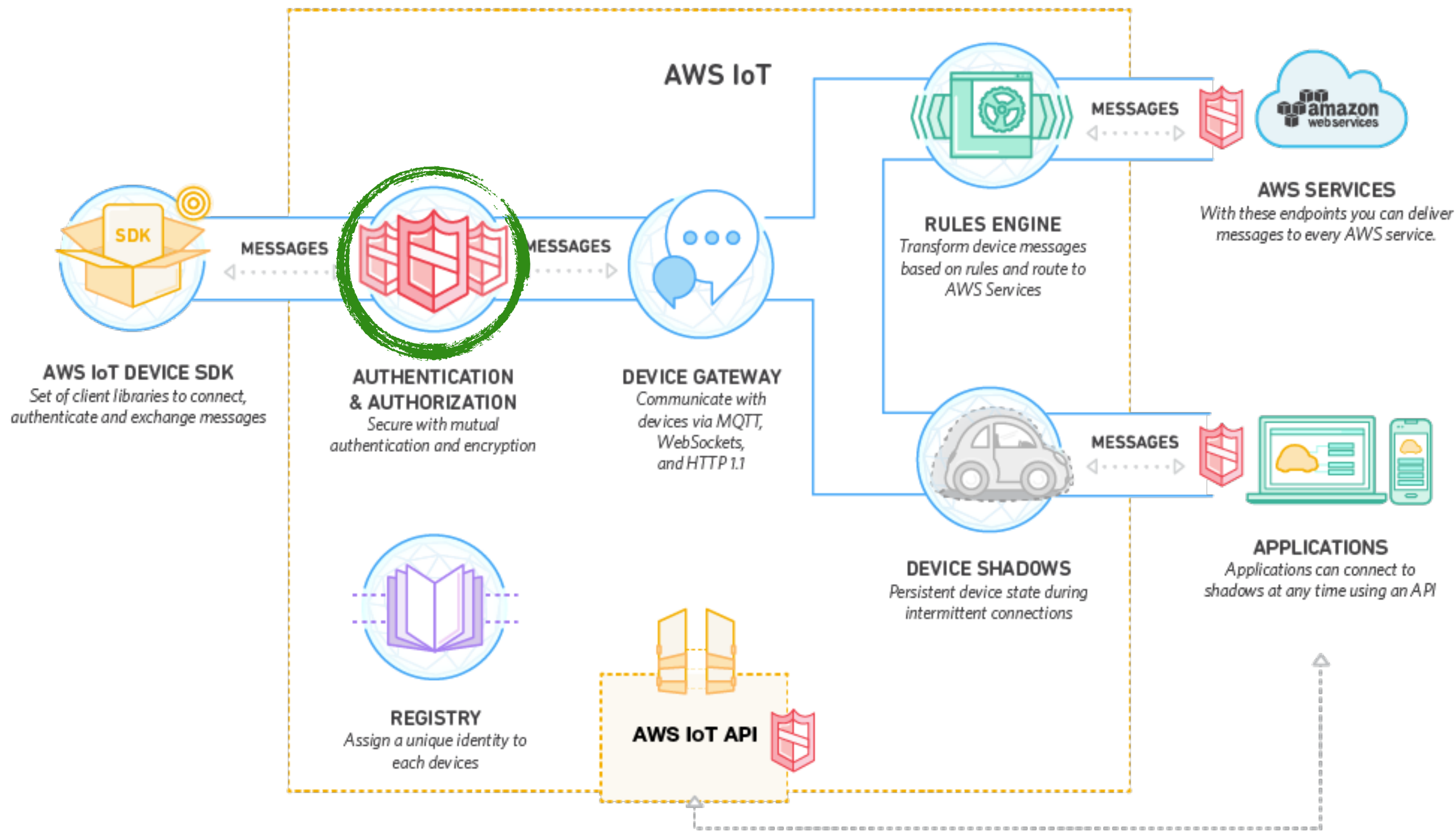
Security



Scalability



AWS IoT

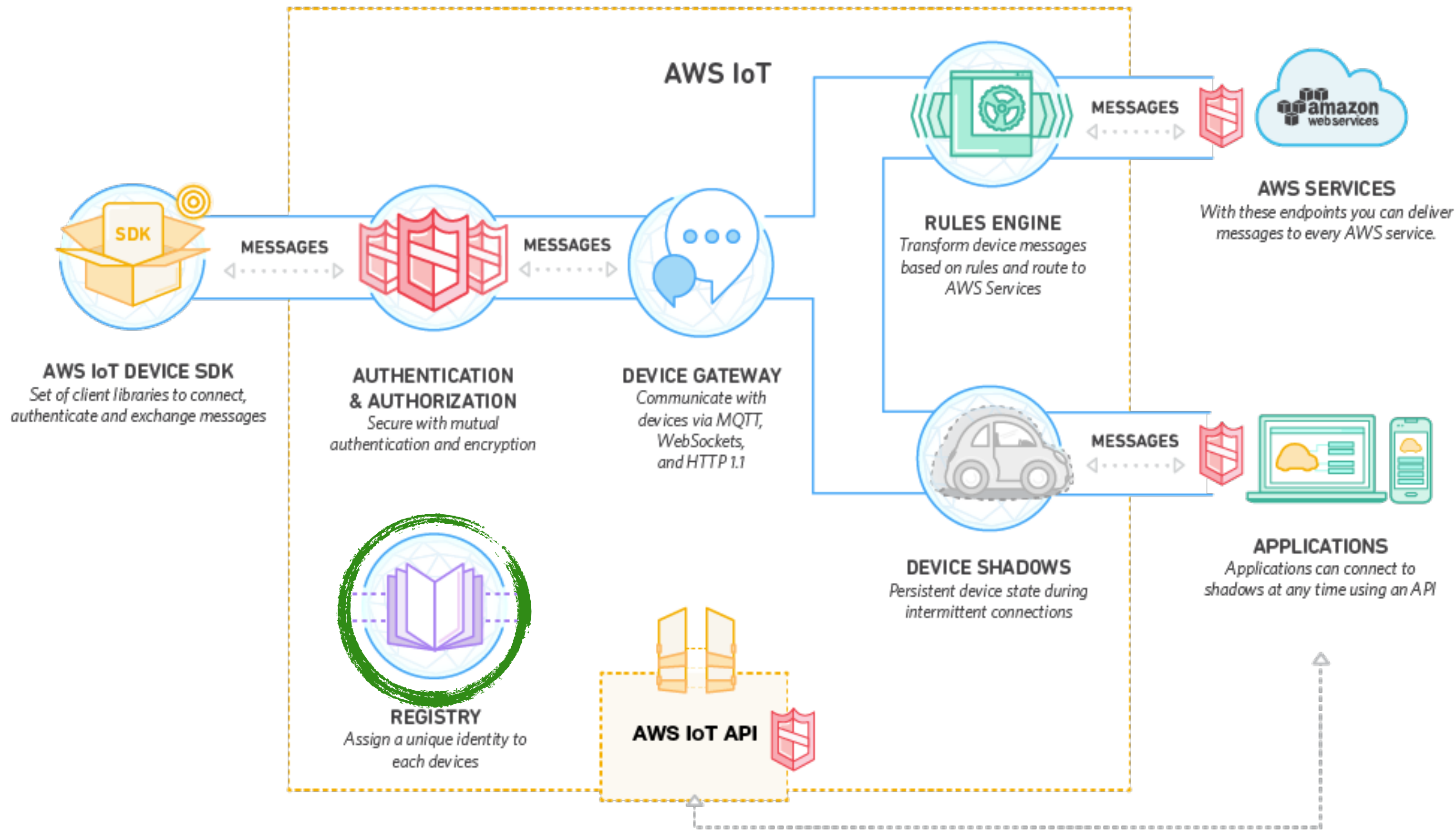


AWS Auth
+
HTTPS

MQTT
+
Mutual Auth TLS

WebSockets
wss://...

Authentication & Authorization

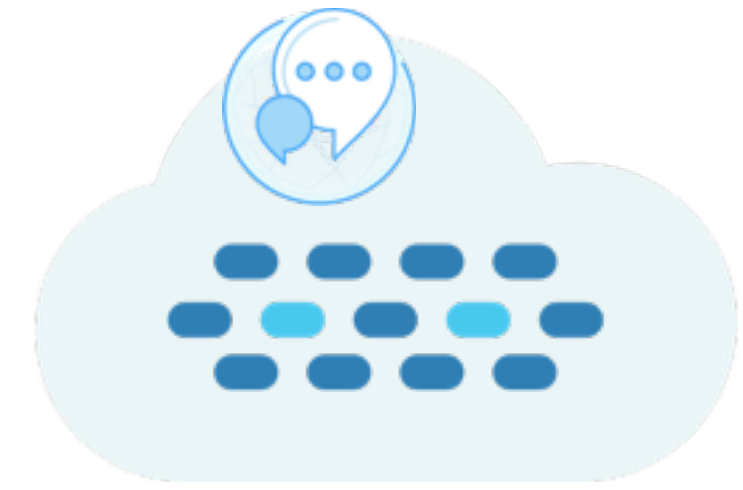
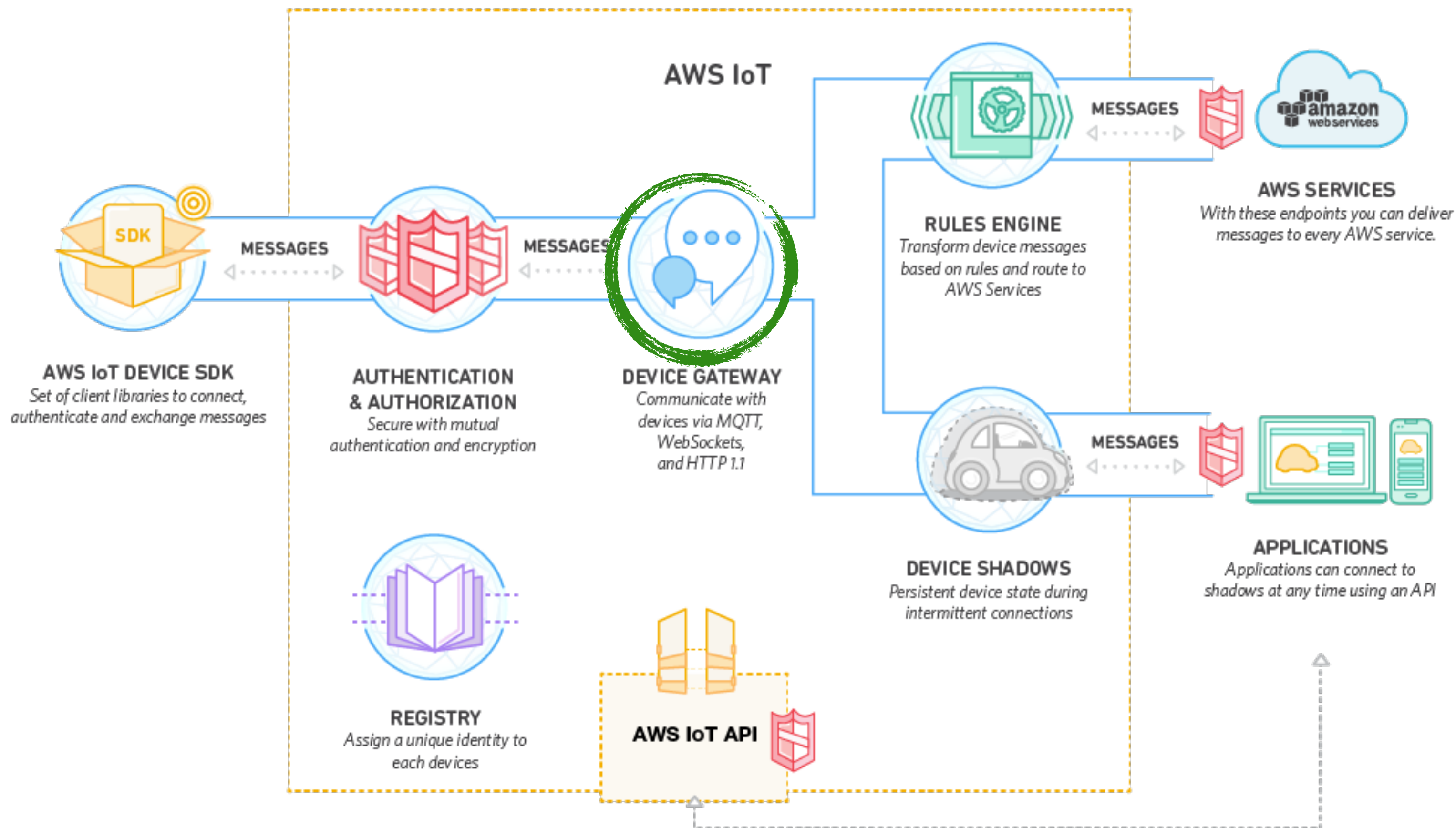


Registry



- Hardware Revision
- Firmware Version
- Serial Numbers
- Device Type
- Device Group
- Device Description
- Link to Product Documentation

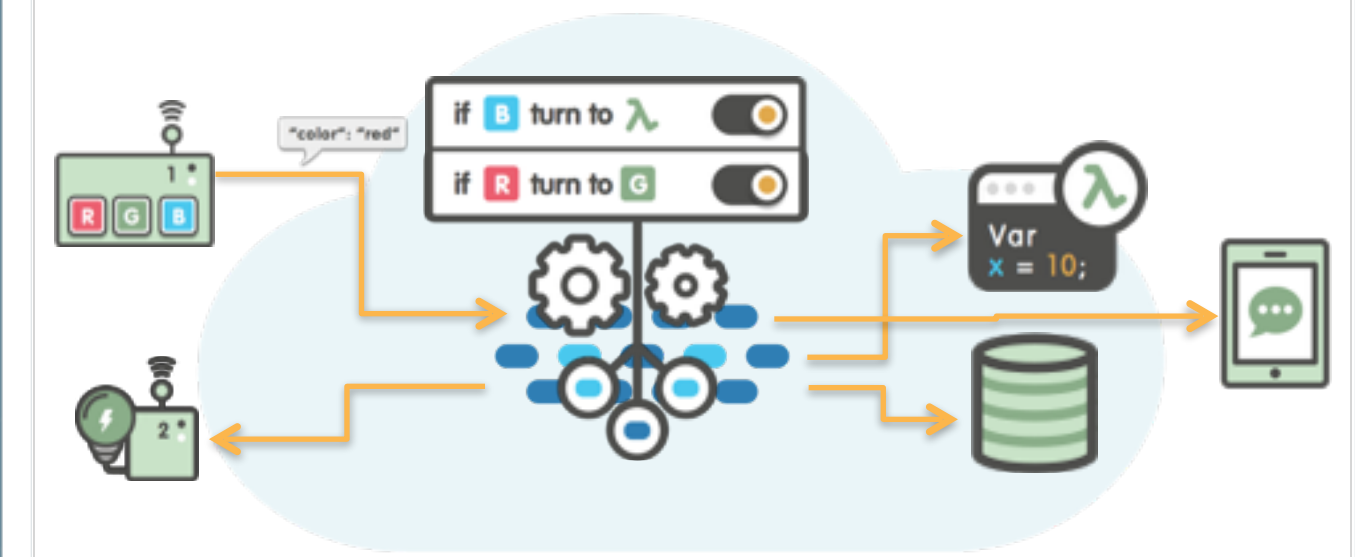
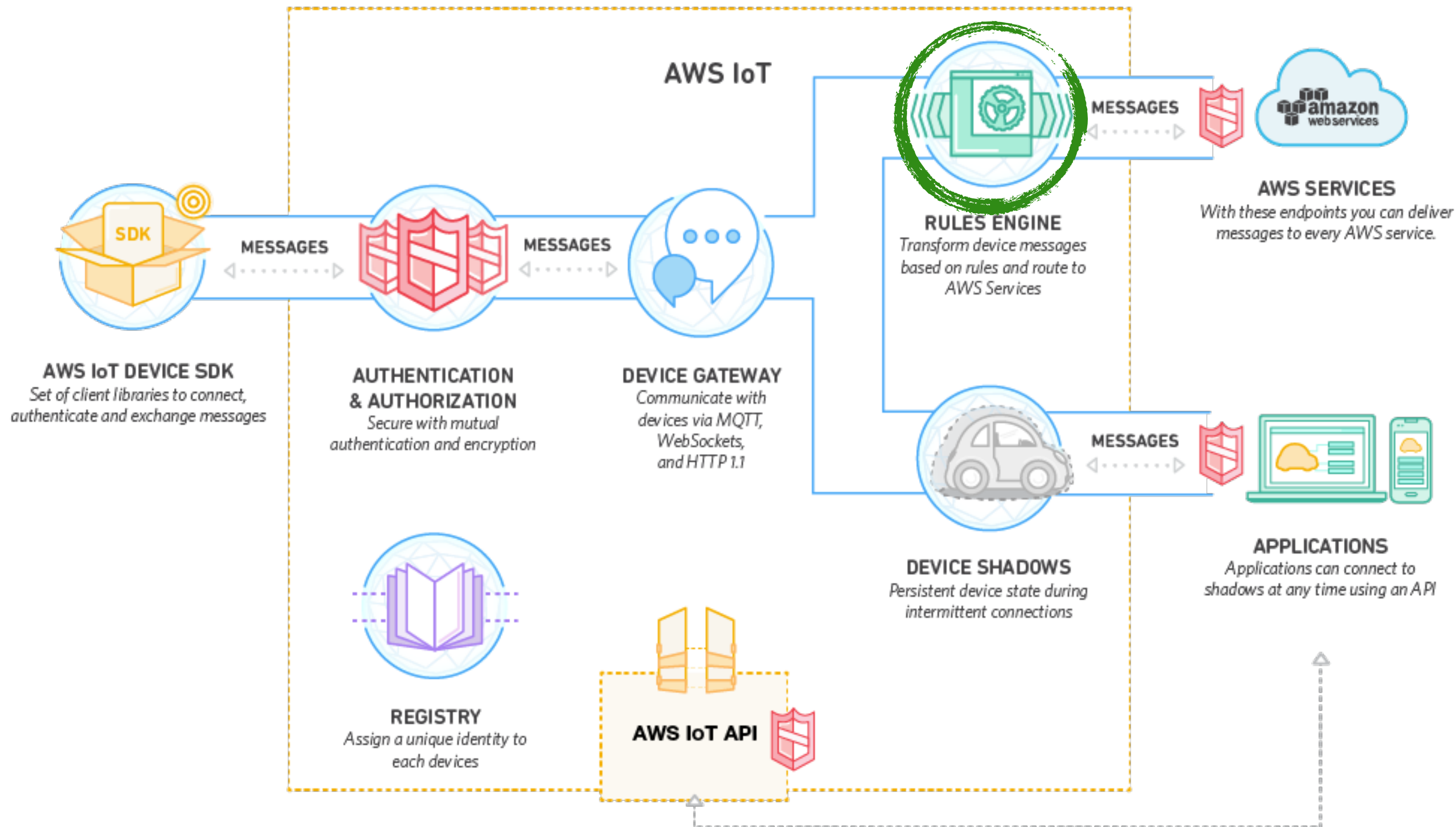
...



Millions of devices and apps can connect over MQTT, WebSockets, and HTTP 1.1

Powerful Pub/Sub Broker with Long-lived bi-directional messages

Device Gateway



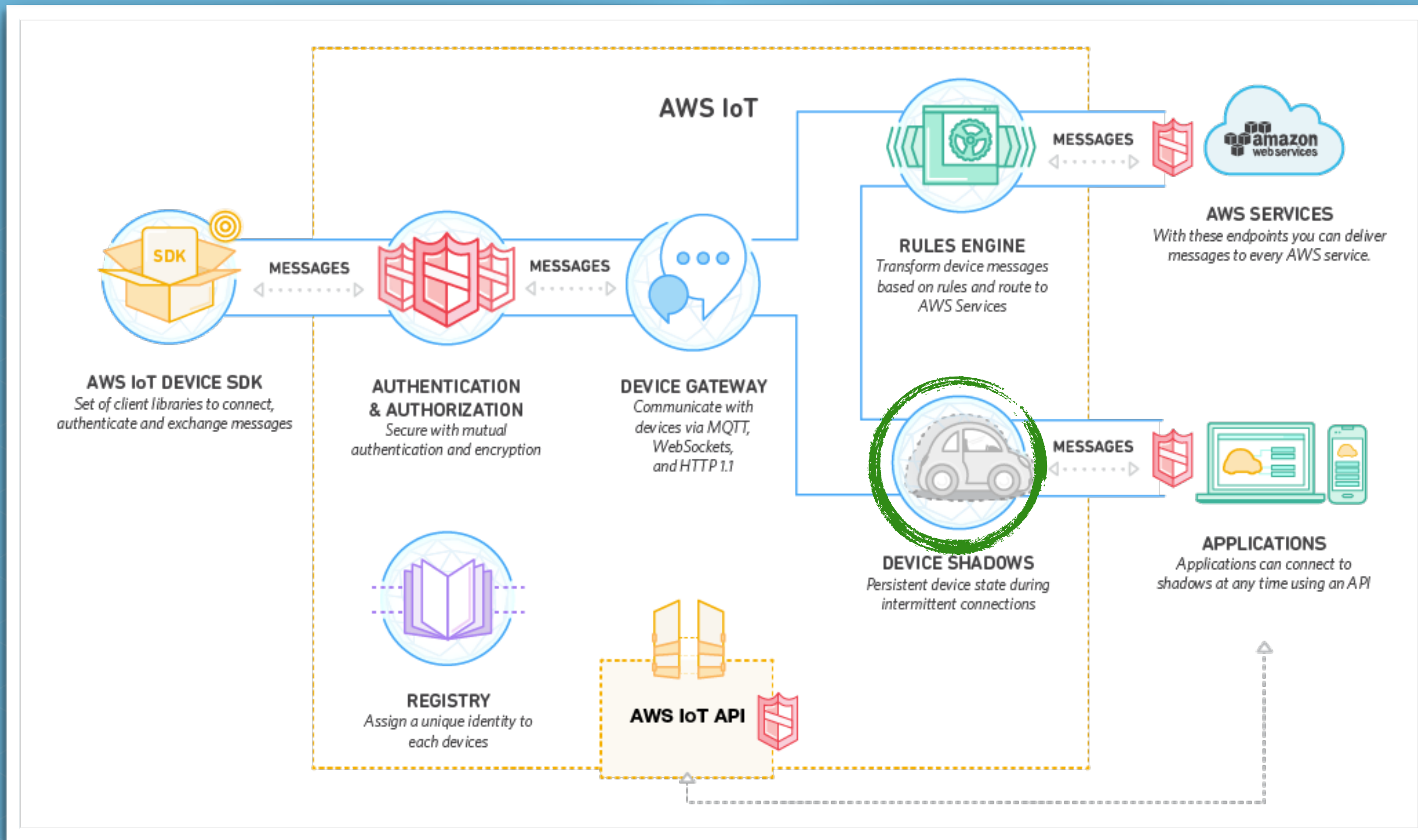
Simple & Familiar Syntax

SQL Statement to define topic filter with JSON support

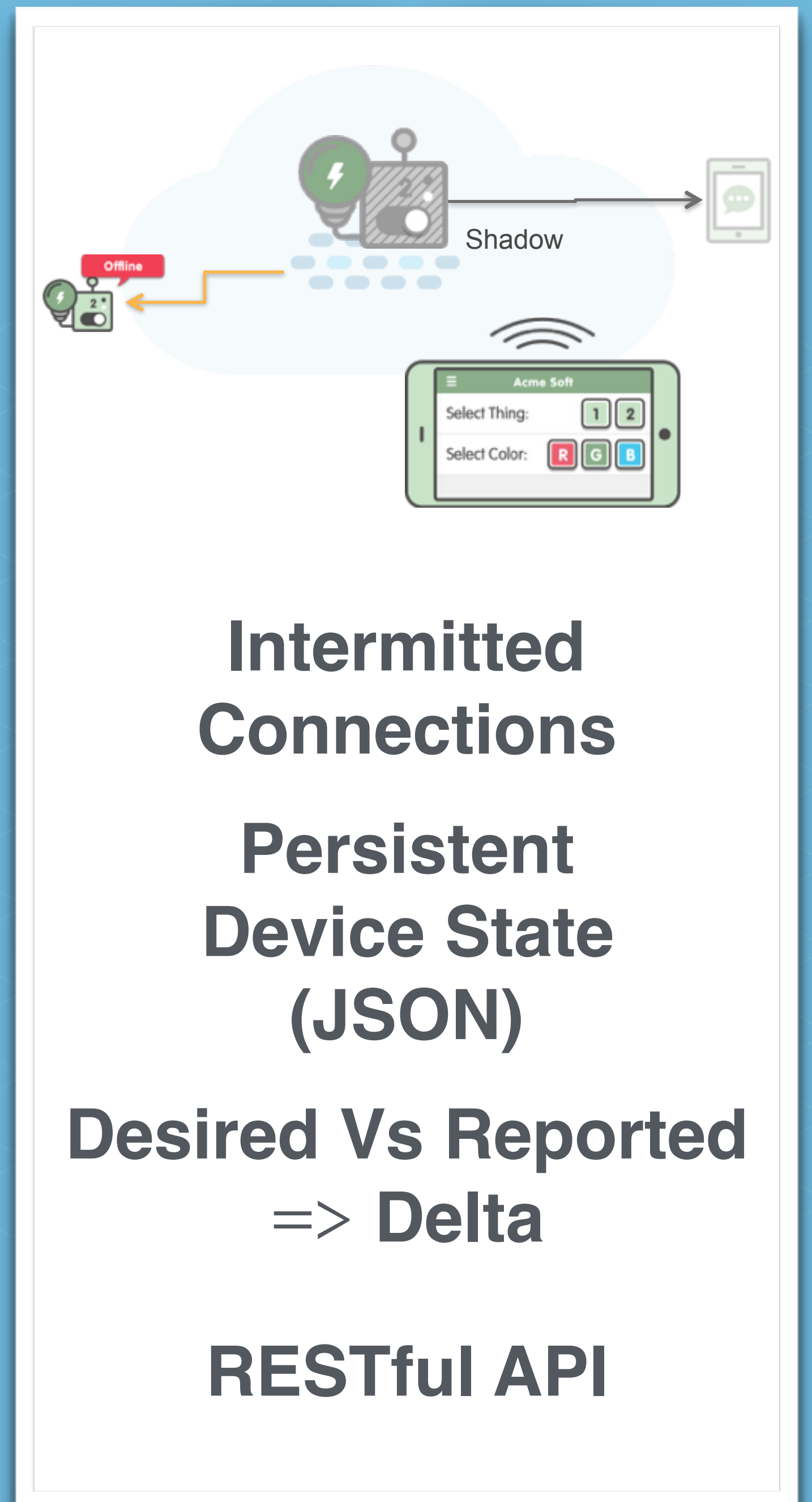
Functions improve signal : noise

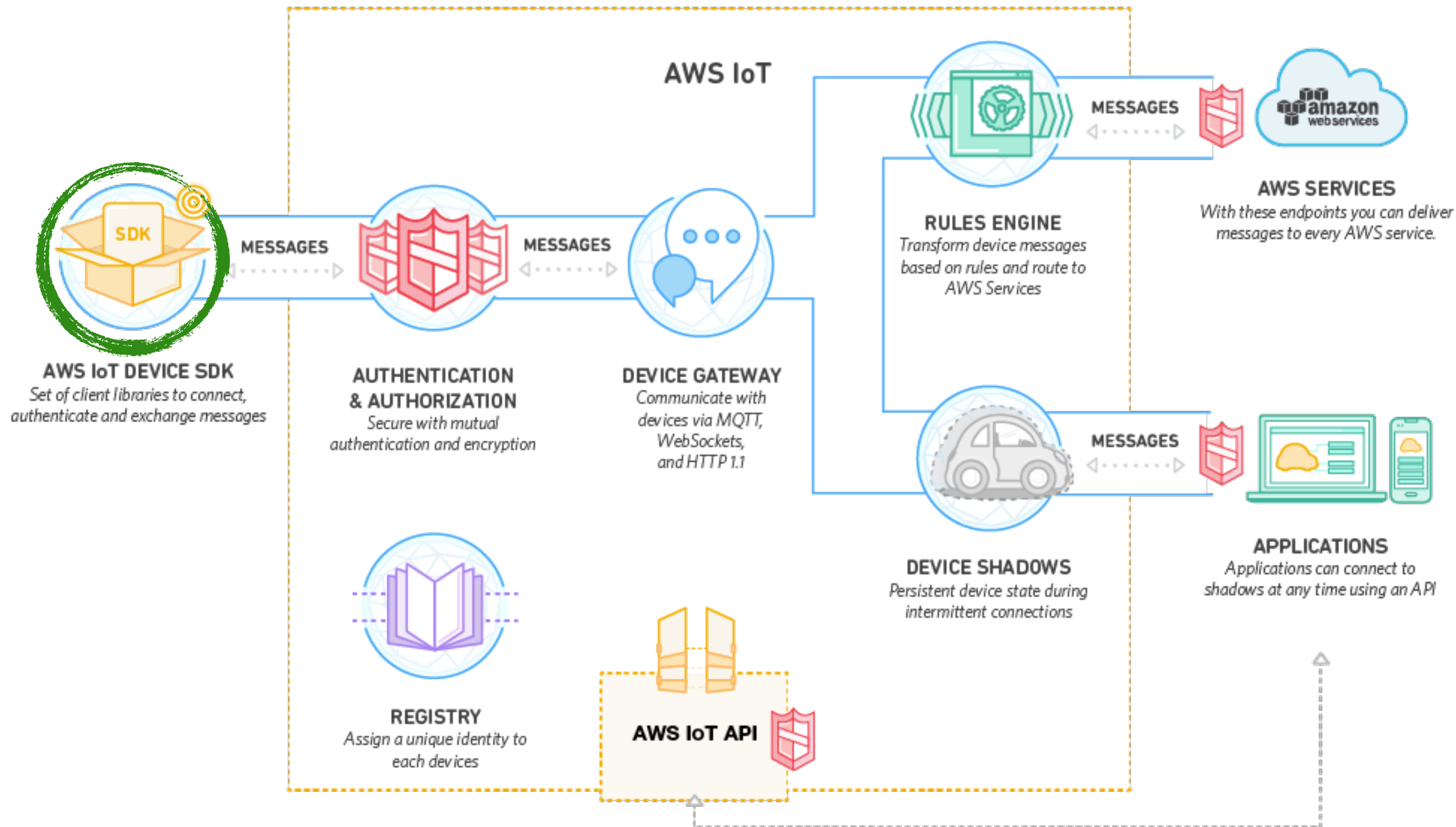
```
SELECT *
FROM 'things/thing-2/color'
WHERE color = 'red'
```

Rules Engine

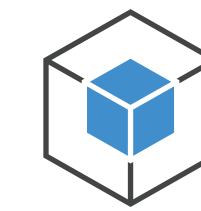


Device Shadow

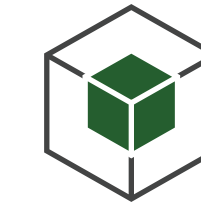




Open Source AWS IoT Device SDK



Embedded C



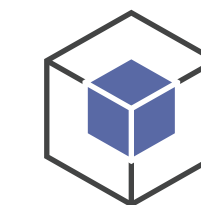
JavaScript



Java



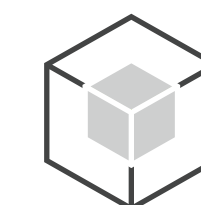
Python



Arduino Yún

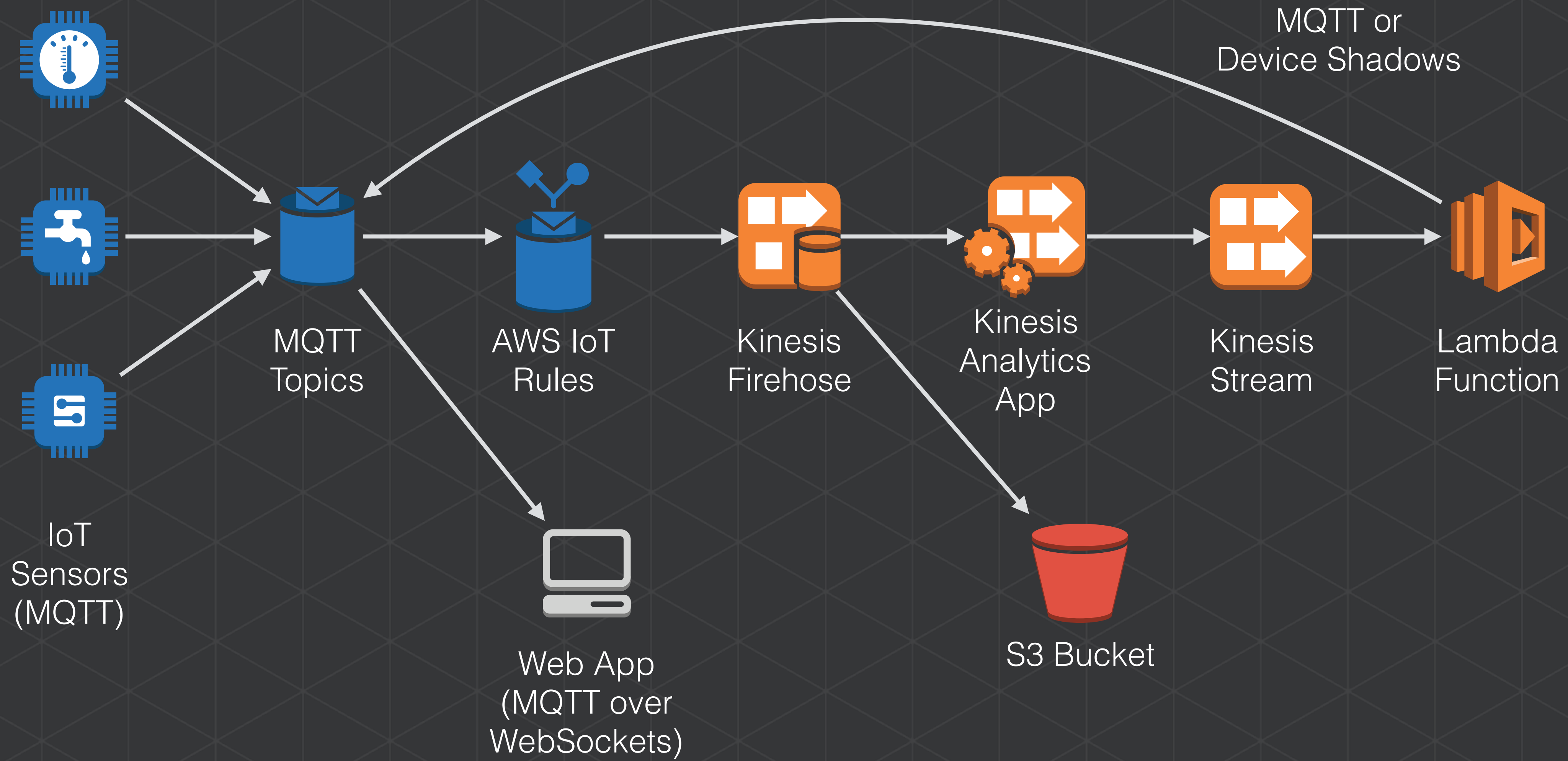


Android



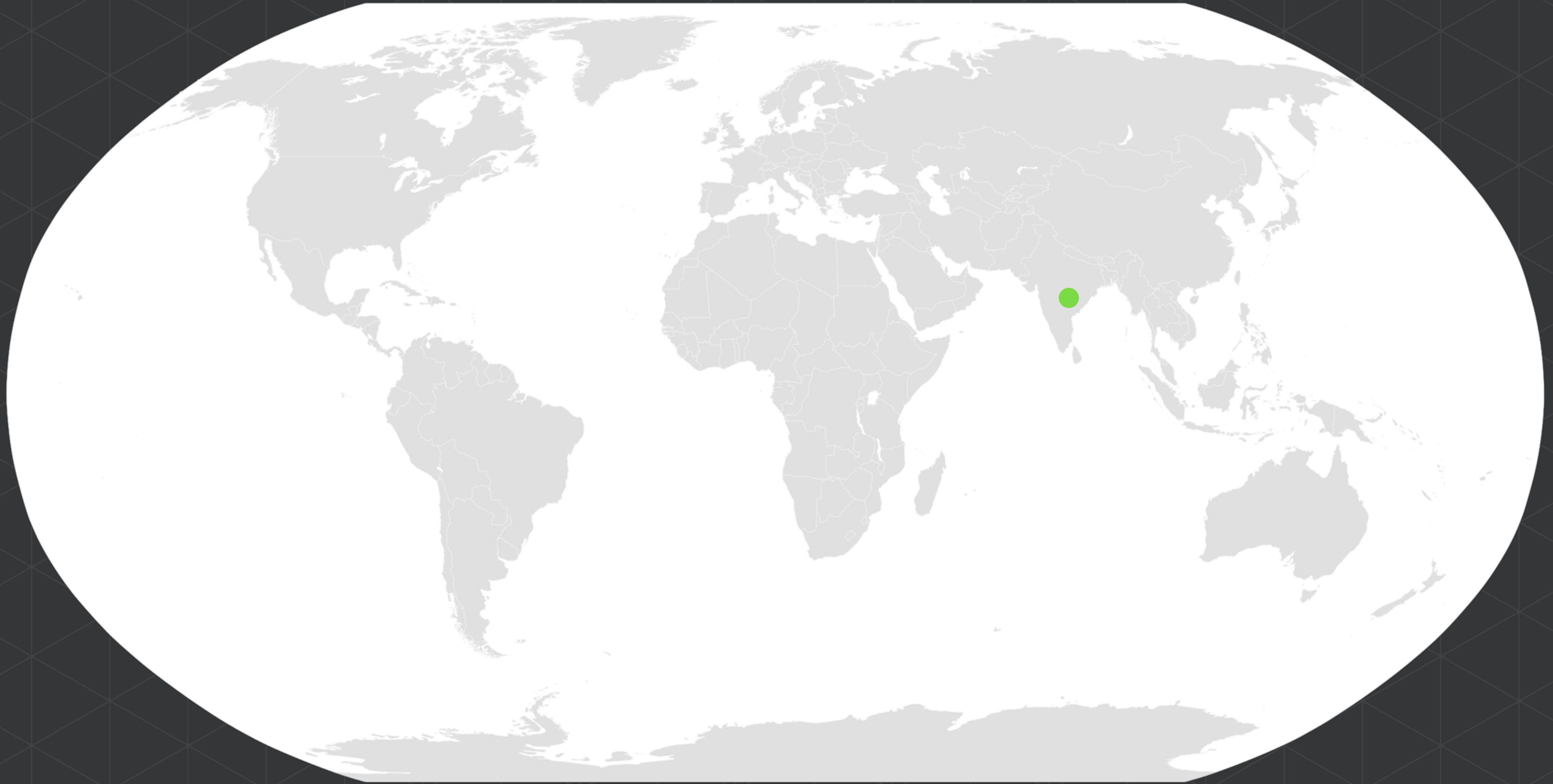
iOS

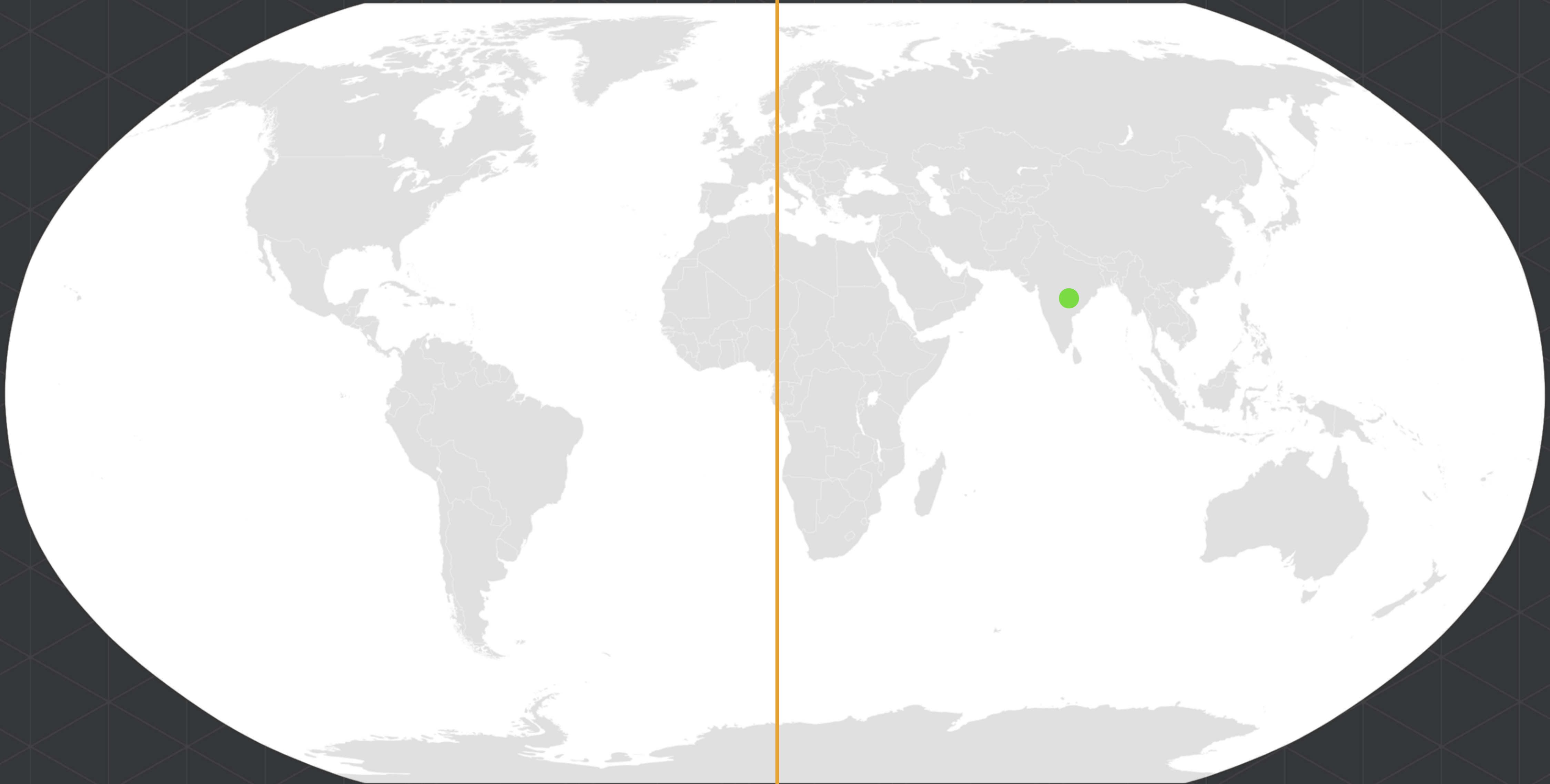
Serverless IoT Analytics

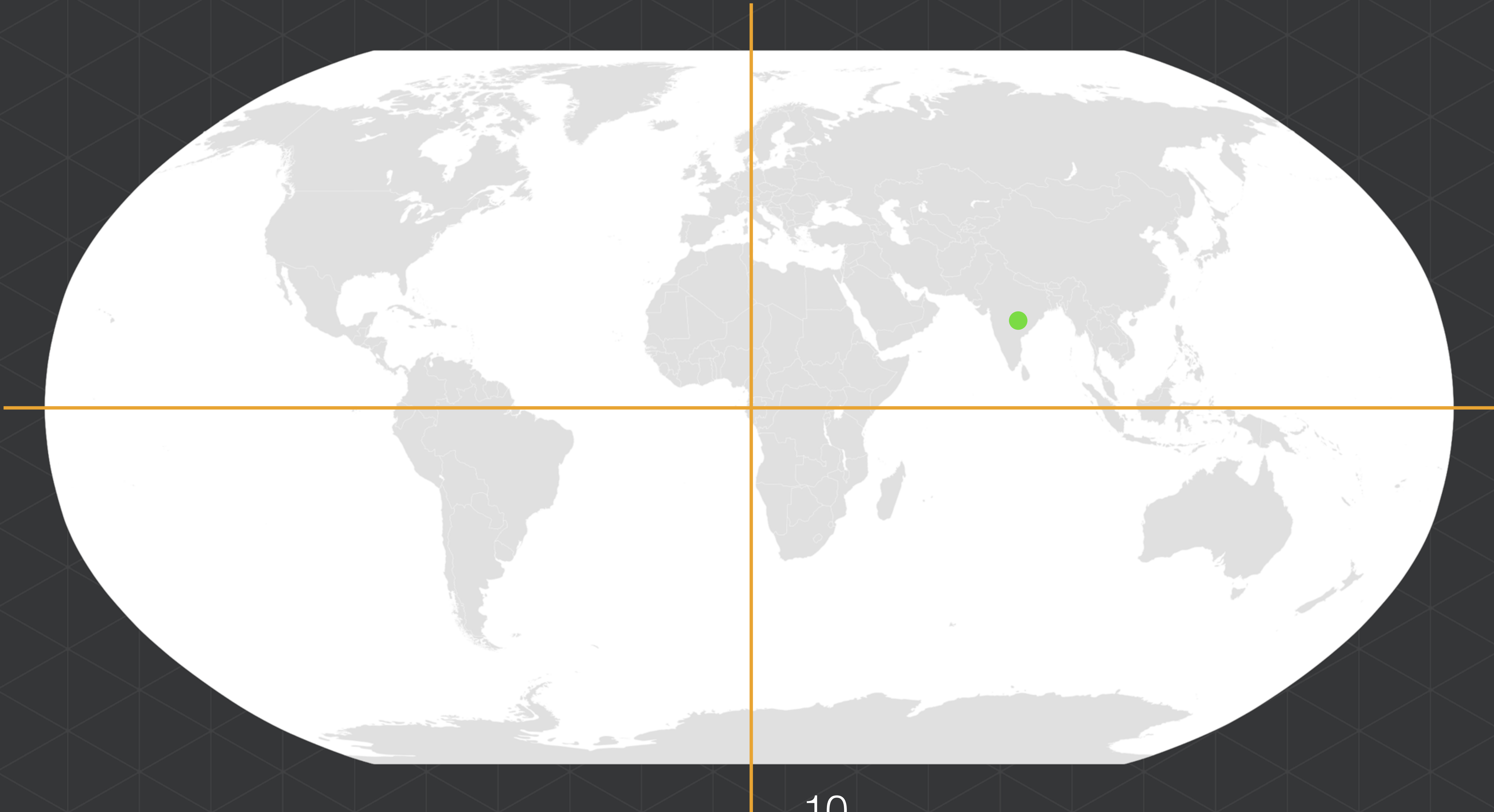




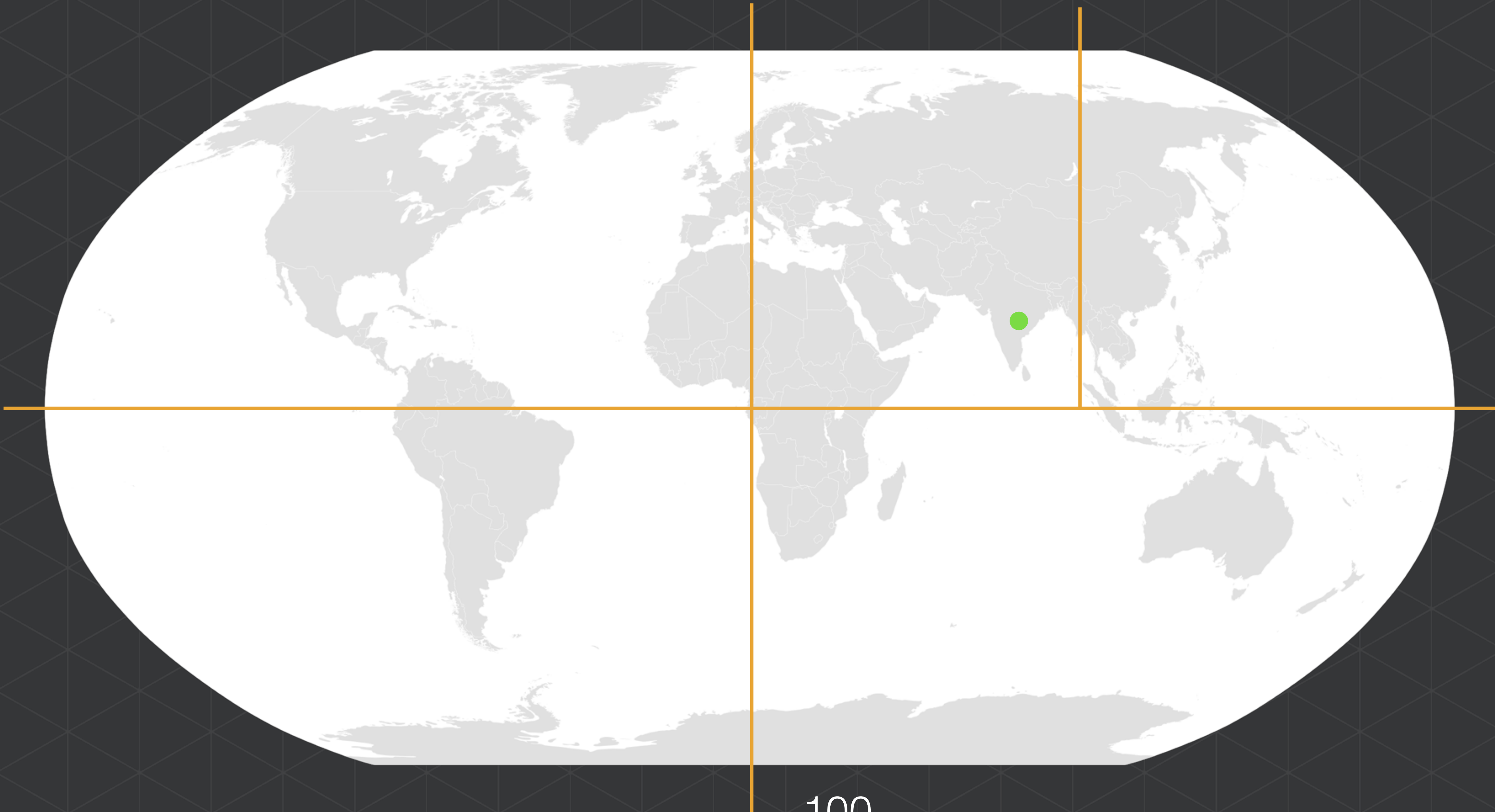
Geohashes



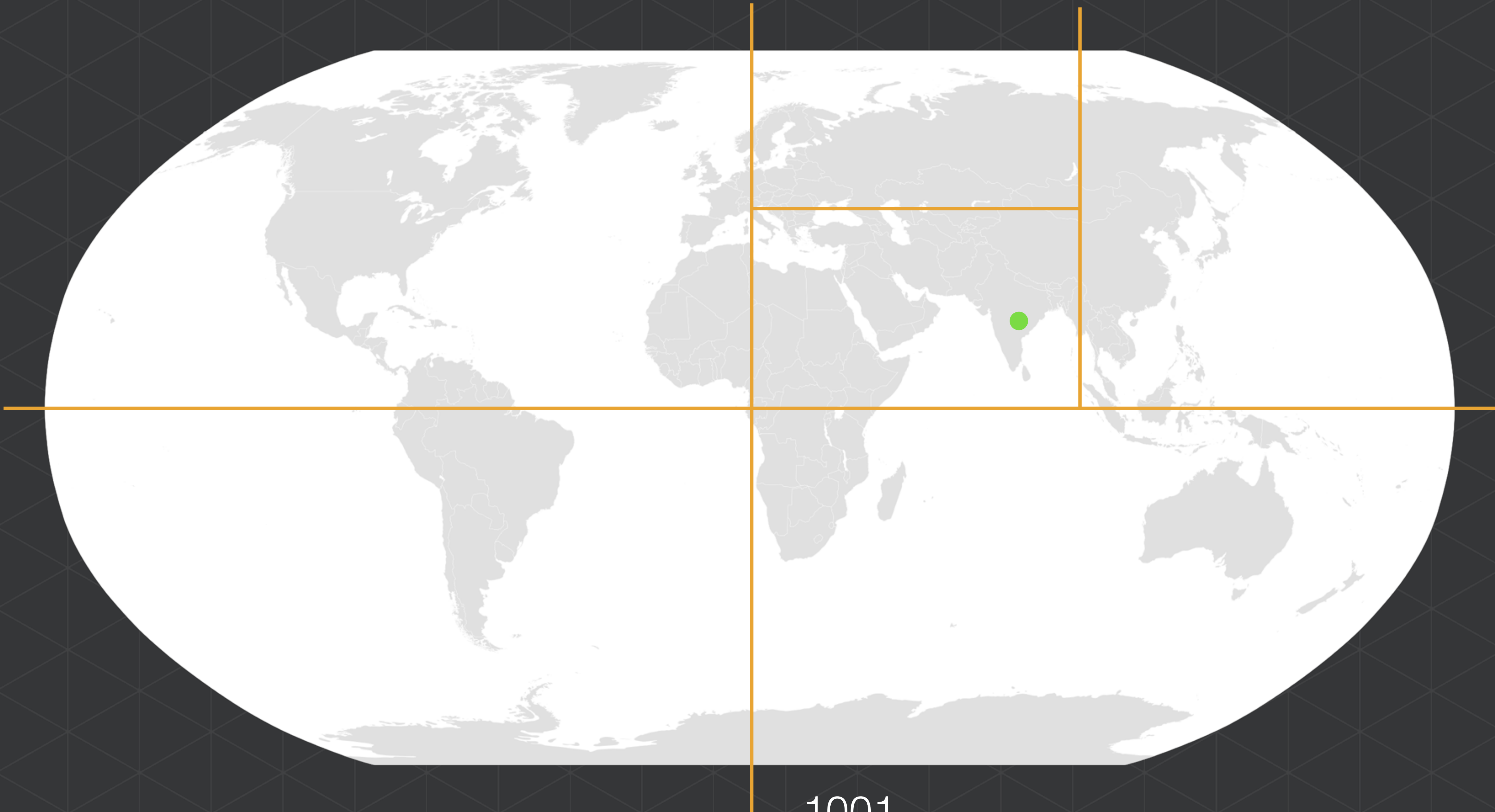




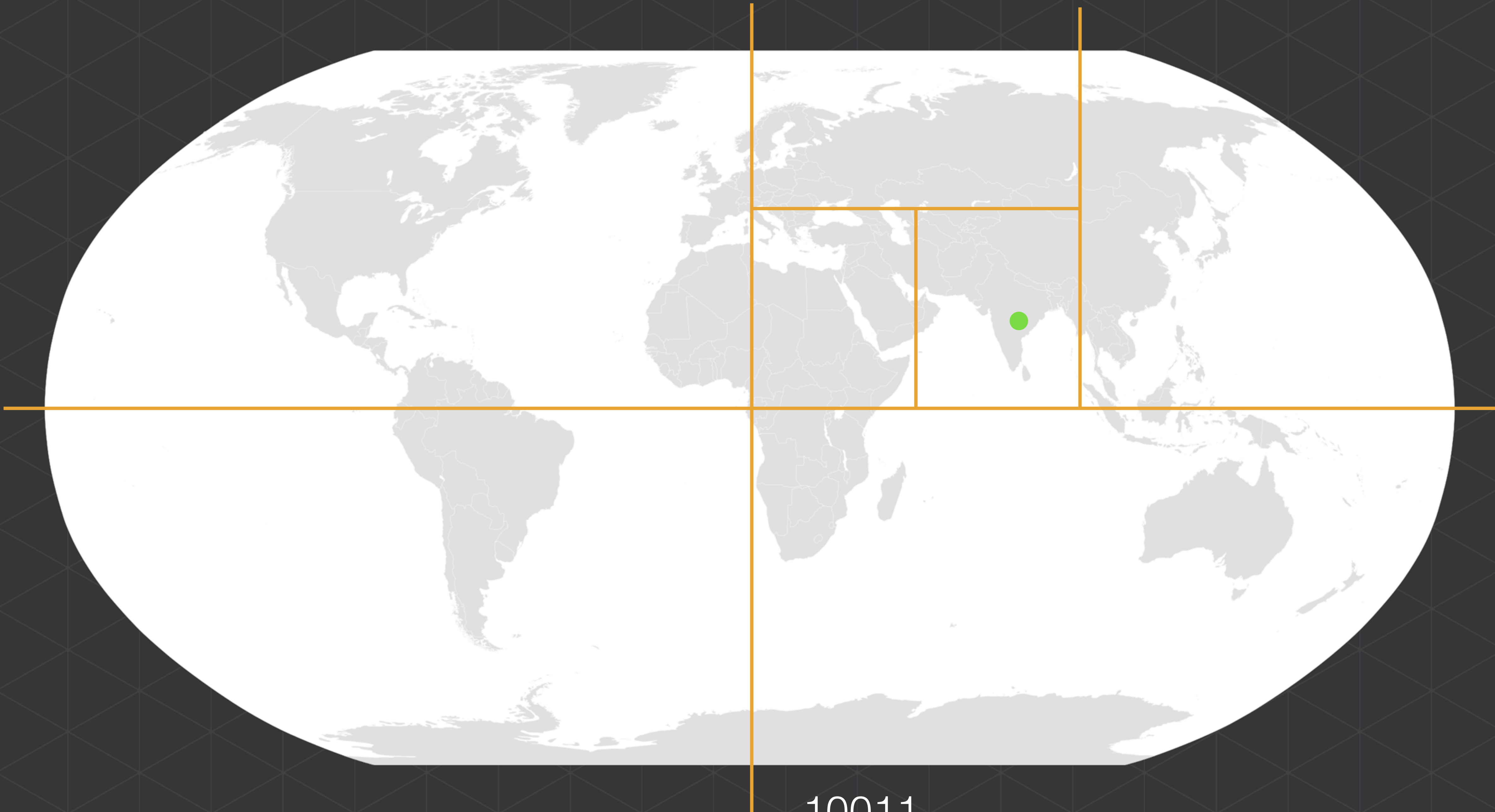
10



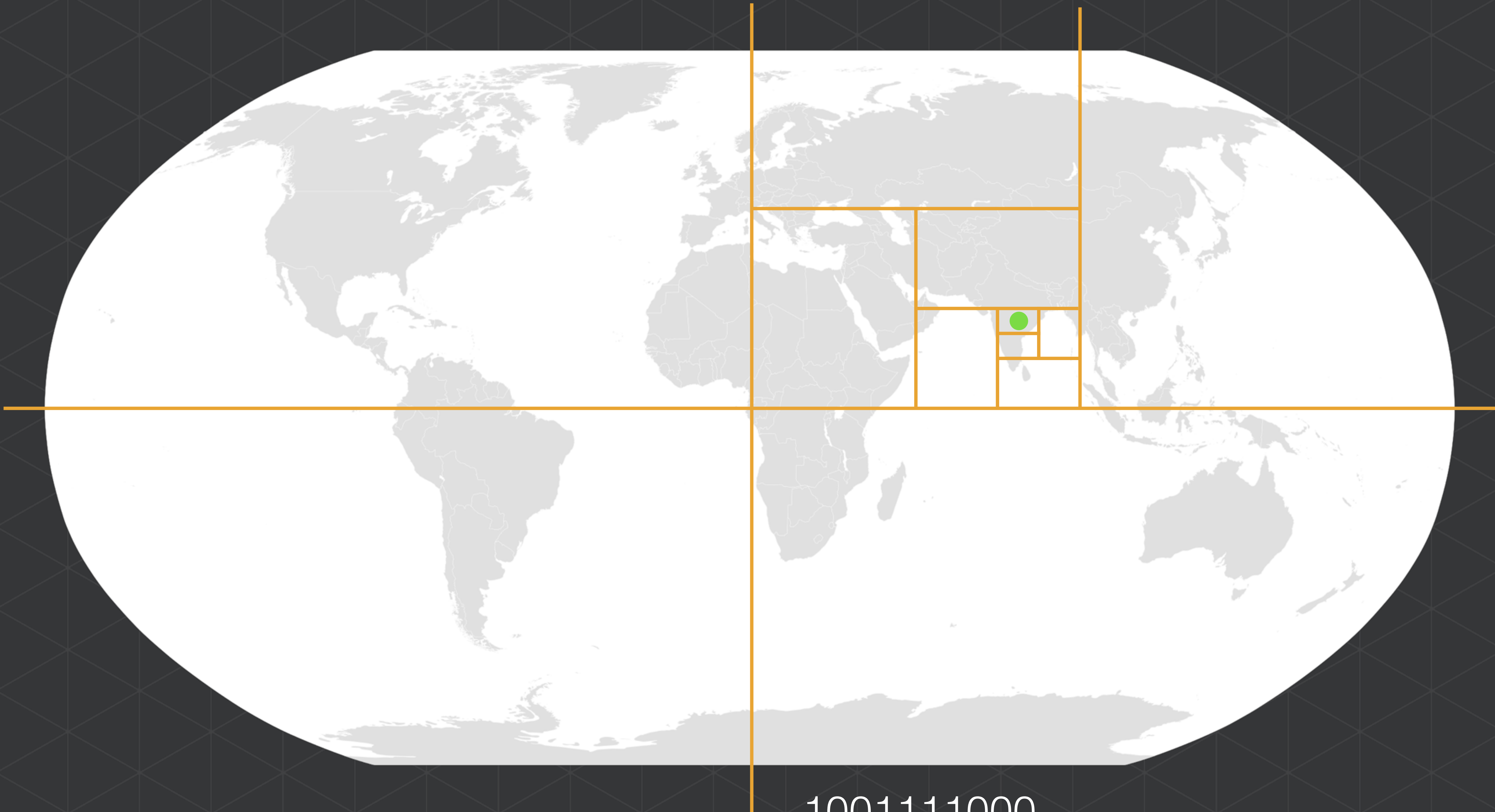
100



1001



10011



1001111000...



(latitude, longitude) → geohash

(52.233333, 21.016667) → u3qcnhzc5z48

Warsaw

(52.233333, 21.016667) → u3qcnhzc5z48

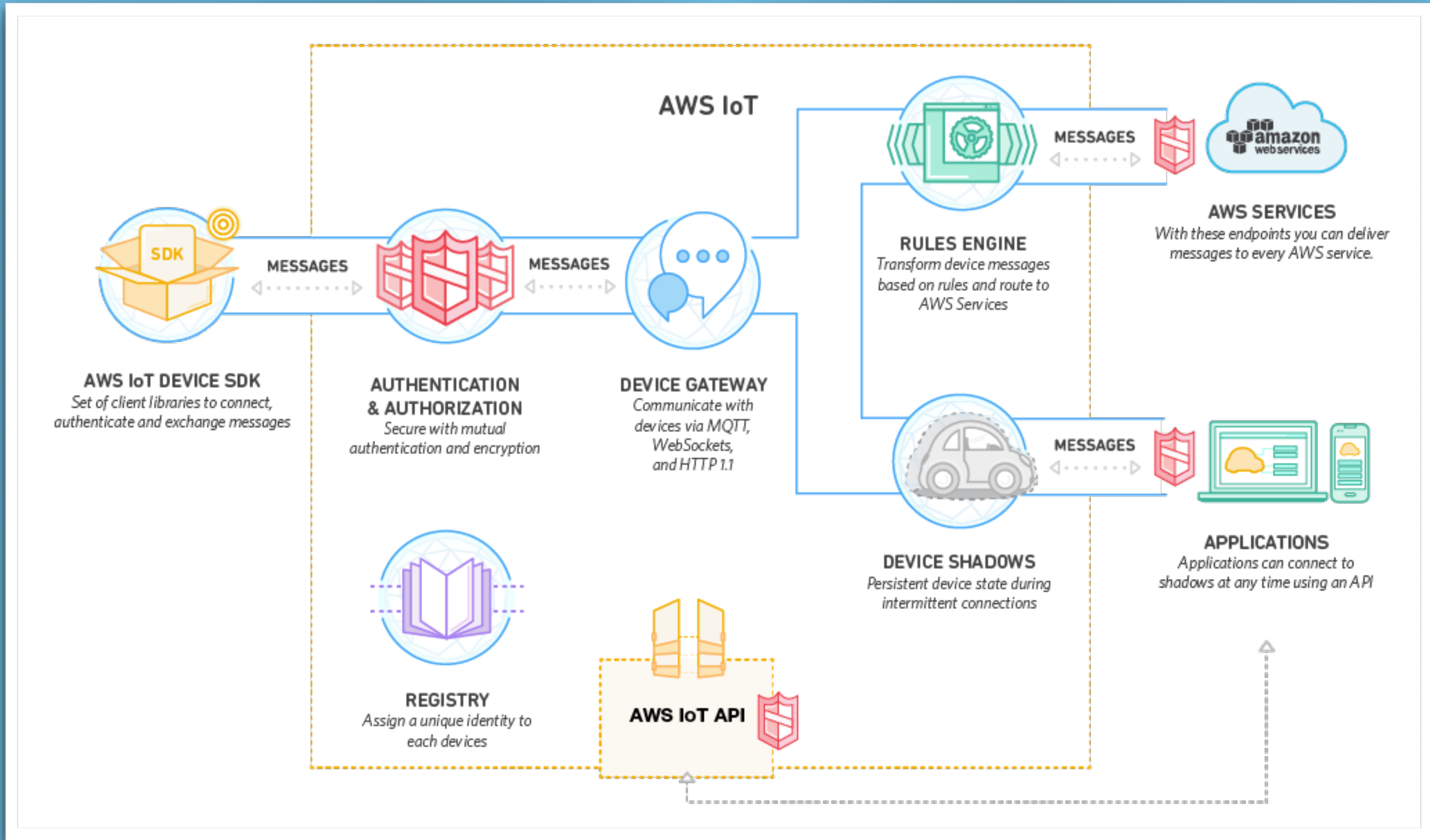
Using Base32 encoding

1 character → 32 (2^5) possible values → 5 bits

`<demo>`

`...`

`</demo>`



AWS IoT



**Build Apps With Services,
Not Servers**



Thank you

 @danilop

 danilop