

serverless IoT-Applications

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about me



- › Developer since 2005
- › living in a Smarthome since 2012
 - › became an IoT Geek
- › before: worked on Bosch IoT Suite for 3 years
- › now: Consultant at innoQ
- › follow me on Twitter: @n1ko_w1ll



agenda

- › AWS
 - › IoT
 - › Lambda
- › use-cases
 - › JITR | on-boarding | pairing
 - › list / search things | command & control | telemetry
 - › connected / disconnected / LWT
 - › encrypted file transfer | firmware update

AWS

AWS



AWS Lambda



AWS IoT



Amazon API Gateway



Amazon Cognito



Amazon CloudWatch

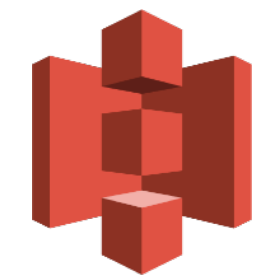
State



Amazon DynamoDB



Amazon Elasticsearch



Amazon S3

Fast Data



Amazon SQS



Amazon SNS



Amazon Kinesis



AWS Lambda

AWS Lambda

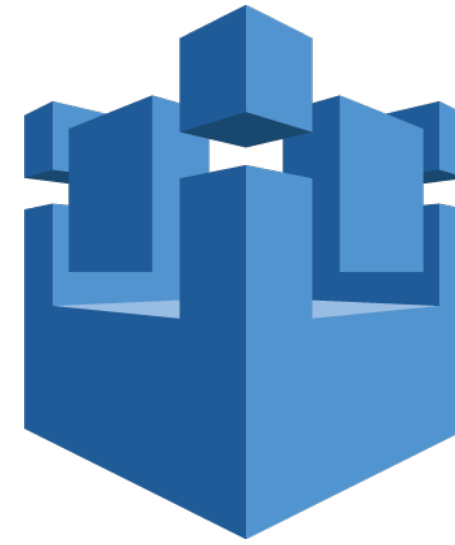
- › Functions-as-a-Service (FaaS)
 - › serverless
 - › „small“ functions
- › stateless compute containers
- › event-driven

AWS Lambda

- › advantages
 - › scalable
 - › pay-per-execution / pay-as-you-go
 - › no upfront capacity planning
 - › significantly reduce operational cost

AWS Lambda

- › disadvantages
 - › vendor lock-in
 - › startup latency
 - › testing
 - › debugging
 - › execution duration



AWS IoT

AWS IoT

- › managed service
- › message broker
- › rules engine
- › shadows
- › registry
- › security

message broker

- › topic based
- › publish / subscribe
 - › topic wildcards
- › protocols
 - › MQTT
 - › MQTT + WebSockets
 - › HTTP

```
$aws/events/presence/connected/clientId  
$aws/events/presence/disconnected/clientId  
  
$aws/things/thingName/shadow/update  
$aws/things/thingName/shadow/update/delta
```

rules engine

- › SQL-like syntax
- › augment or filter data
- › rule actions
 - › state stores
 - › fast data pipelines
 - › CloudWatch
 - › Lambda
 - › republish

```
SELECT
    *,
    newuuid() AS requestId,
    clientId() AS clientId,
    timestamp() AS timestamp,
    topic(2) AS deviceId,
    topic(4) AS sensorId
FROM 'device/+/sensor/+/v1'
WHERE temperature > 50 AND color <> 'red'
```

shadows

- › JSON document
- › current state of thing
- › connection independent
- › supports client tokens
- › supports versioning
- › MQTT topics
- › RESTful API

```
{
  "state" : {
    "desired" : { "color" : "RED" },
    "reported" : { "color" : „GREEN" }
  },
  "metadata" : {
    "desired" : { "color" : { "timestamp" : 12345 } },
    "reported" : { "color" : { "timestamp" : 12345 } }
  },
  "version" : 10,
  "clientToken" : "UniqueClientToken",
  "timestamp": 123456789
}
```


registry

- › manage your things
 - › physical device or sensor
 - › logical entity
- › attributes
- › thing types

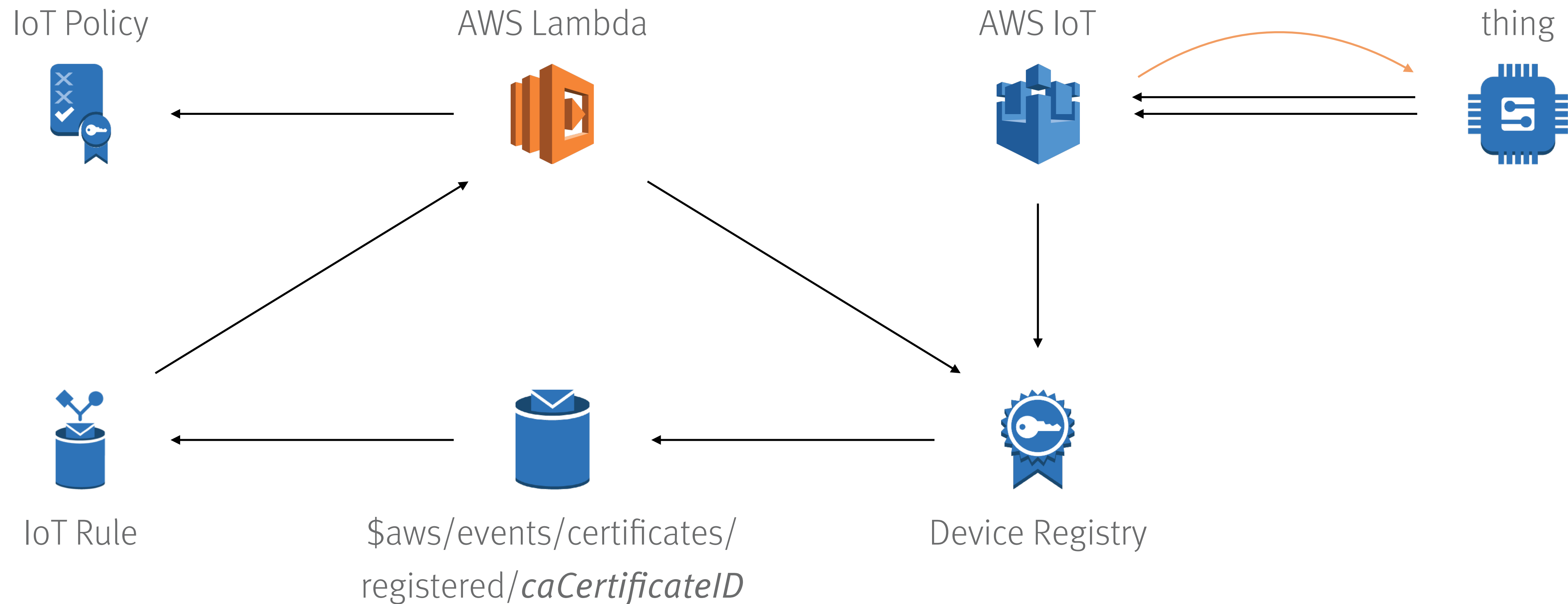
```
{  
  "version": 3,  
  "thingName": "MyLightBulb",  
  "defaultClientId": "MyLightBulb",  
  "thingTypeName": "LightBulb",  
  "attributes": {  
    "model": "123",  
    "wattage": "75"  
  }  
}
```

security

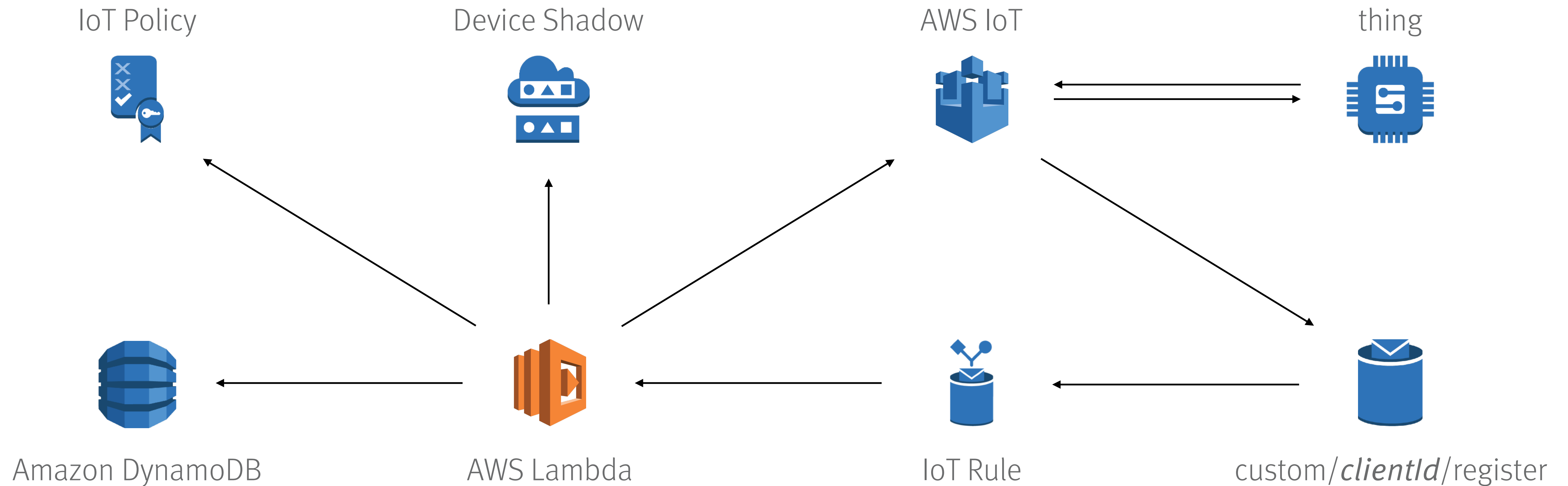
- › mutual authentication with X509 certificates + TLS 1.2
 - › or SigV4 for HTTPS and WebSockets
- › bring your own certificate
 - › JITR
 - › Atmel ECC508
- › policy based access with dynamic values
- › role based rules action execution

use-cases

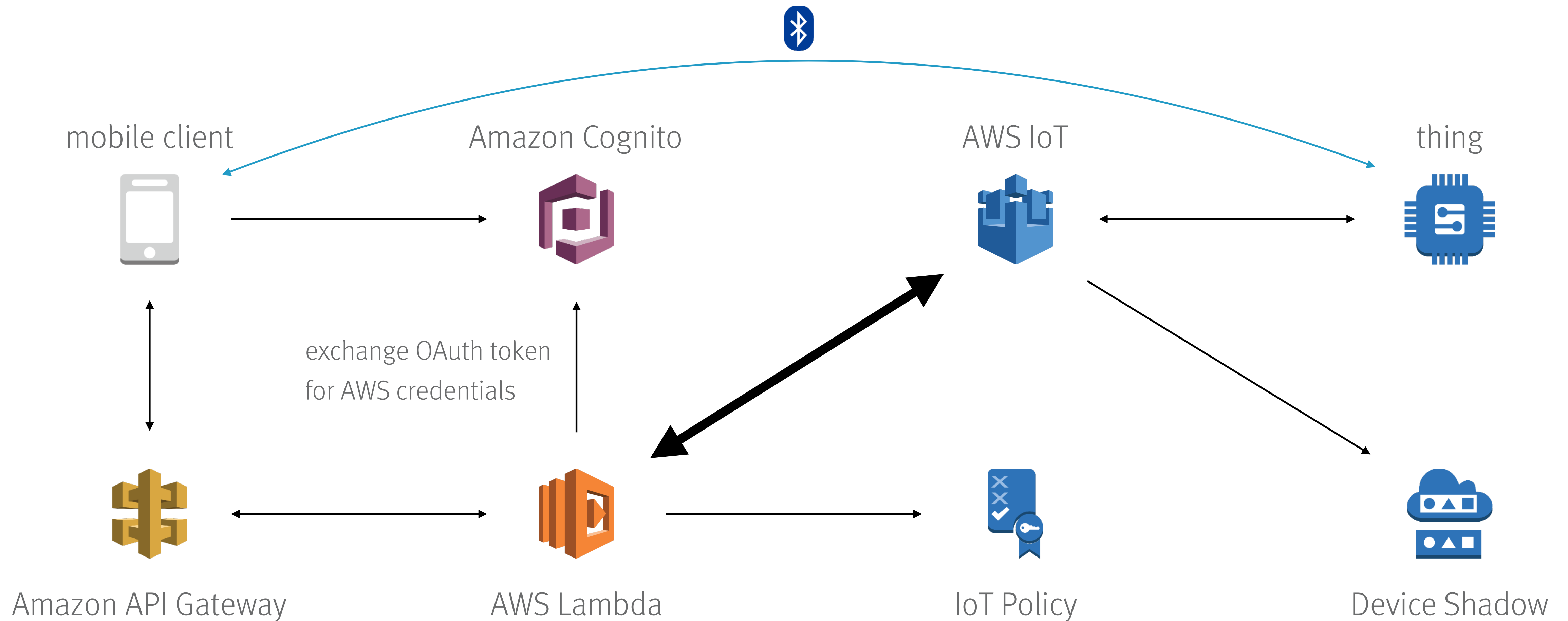
just in time registration (JITR)



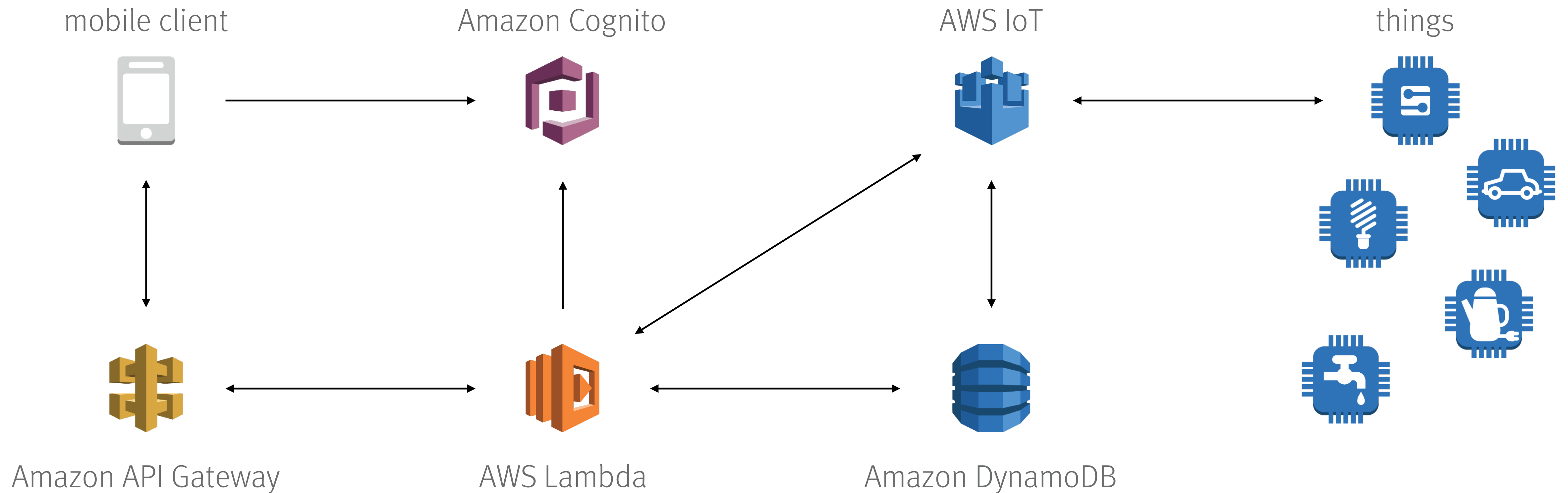
on-boarding



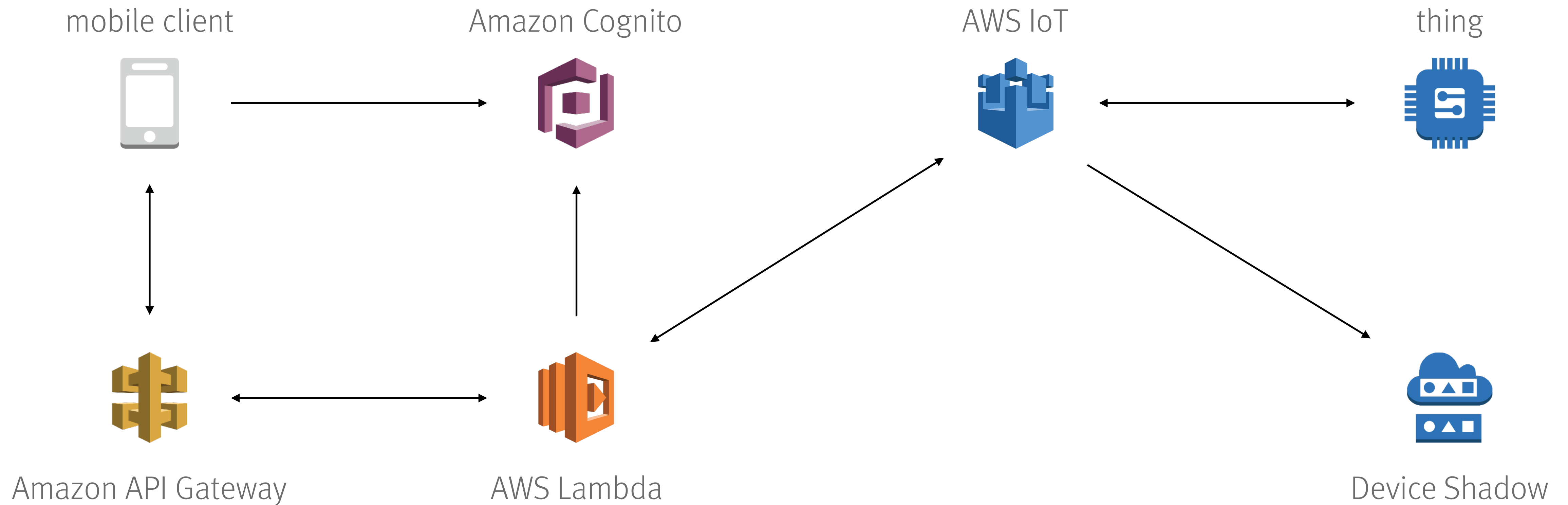
thing pairing



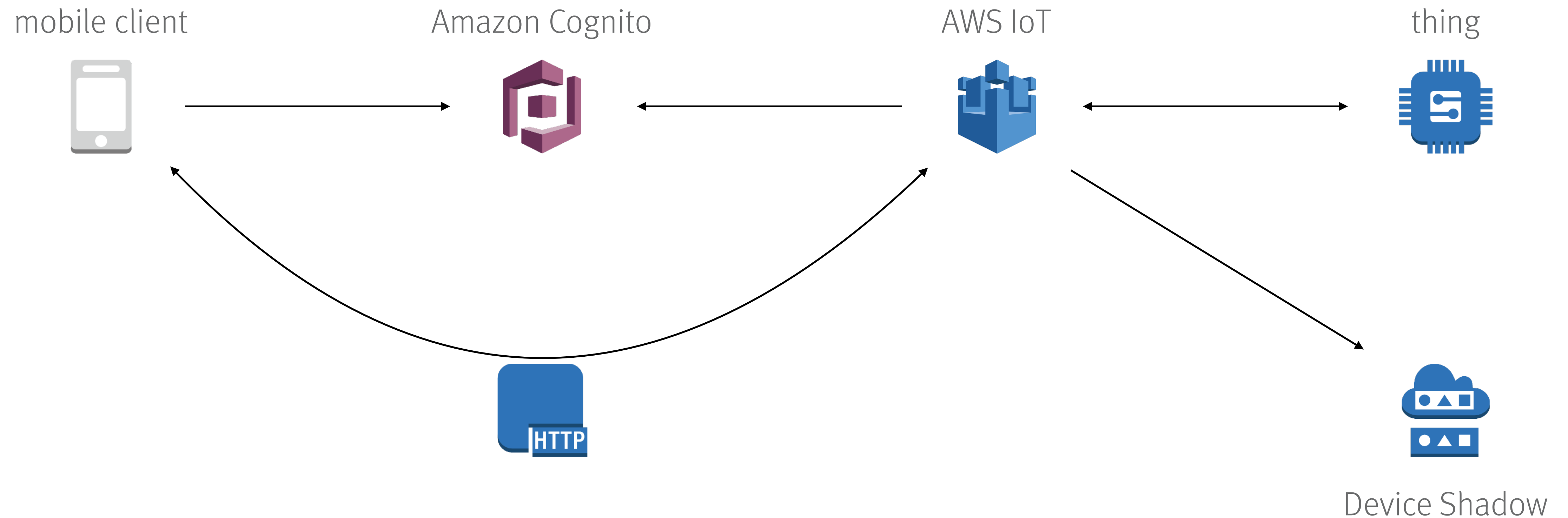
list / search things



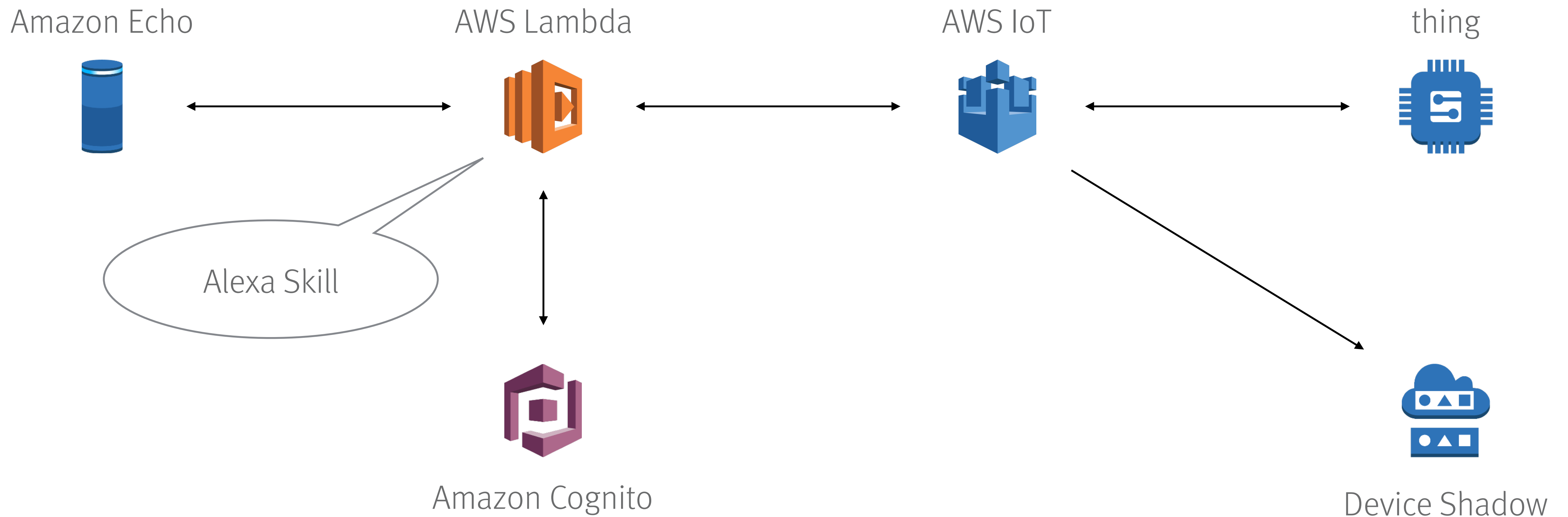
command & control



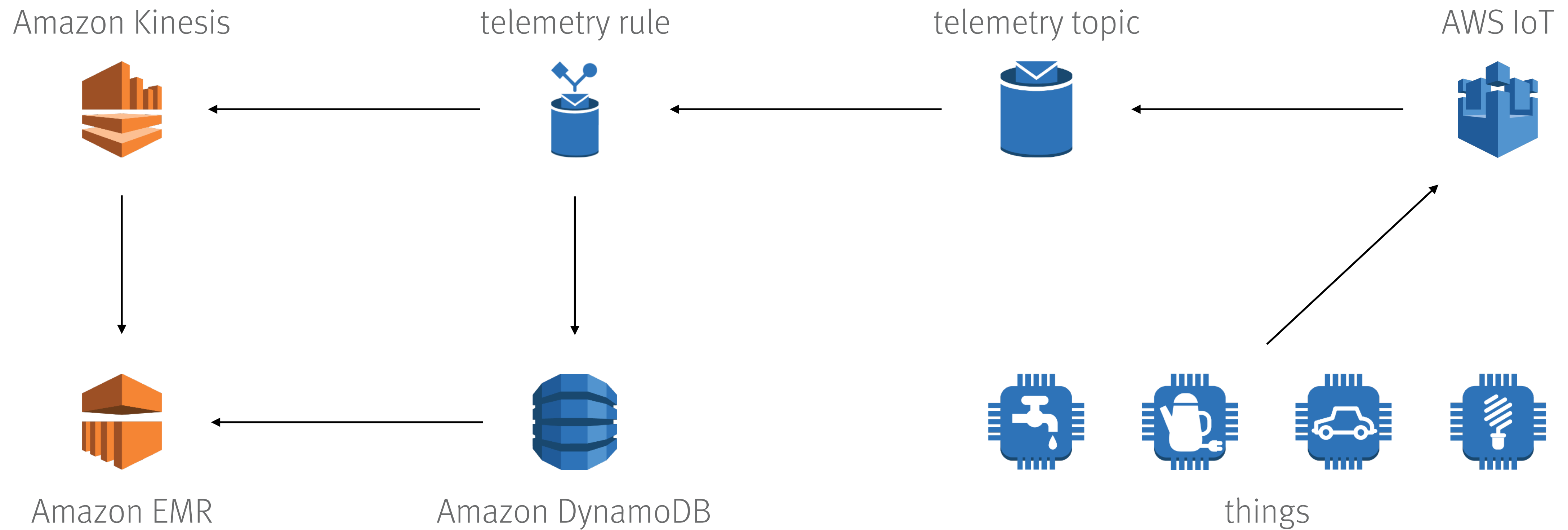
command & control



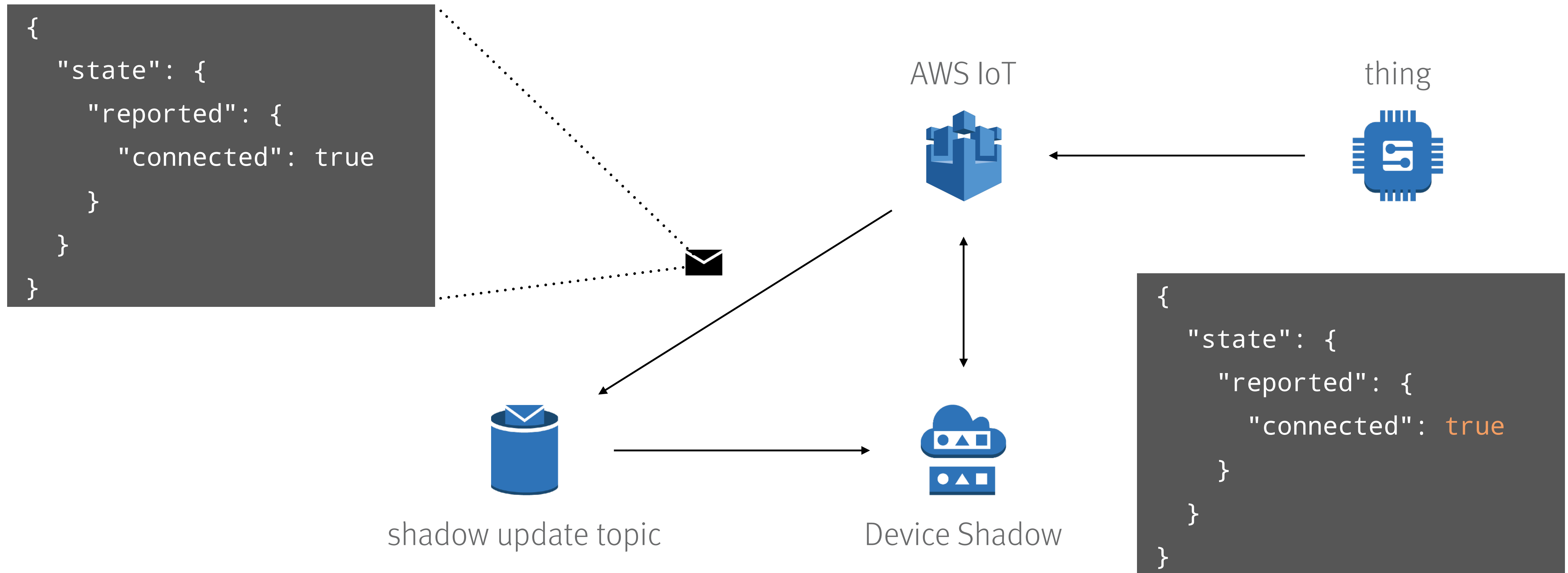
command & control



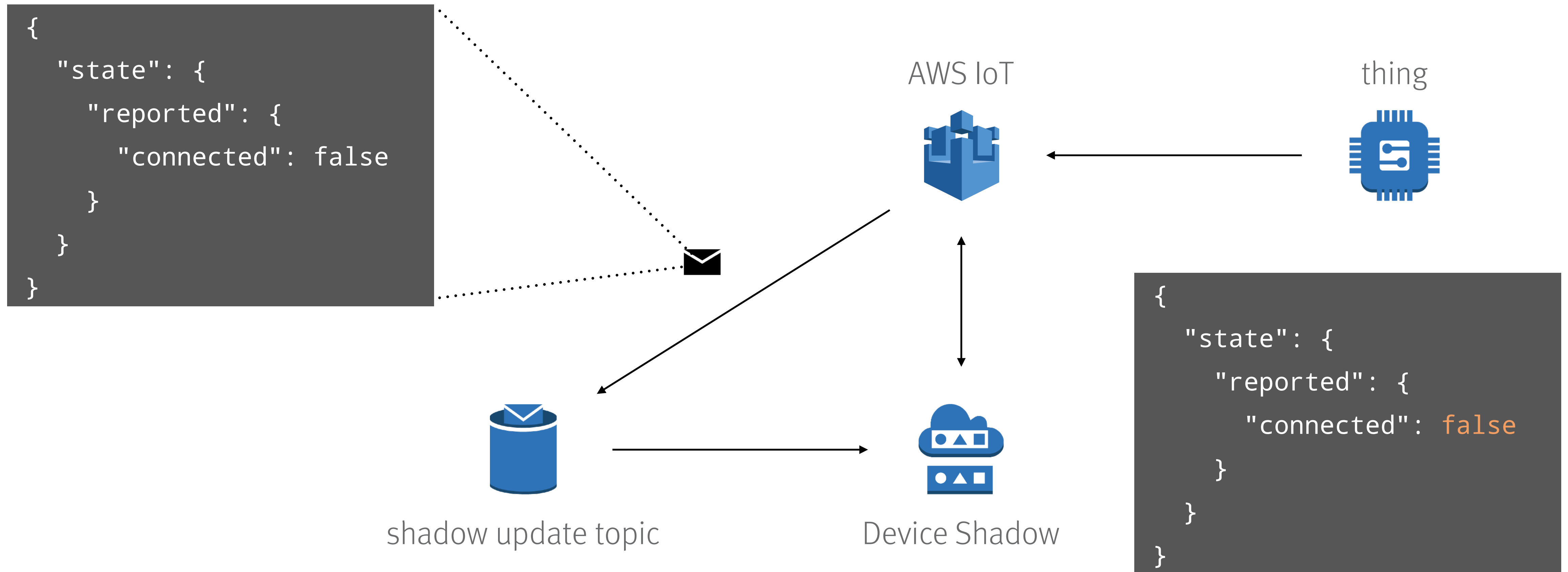
telemetry



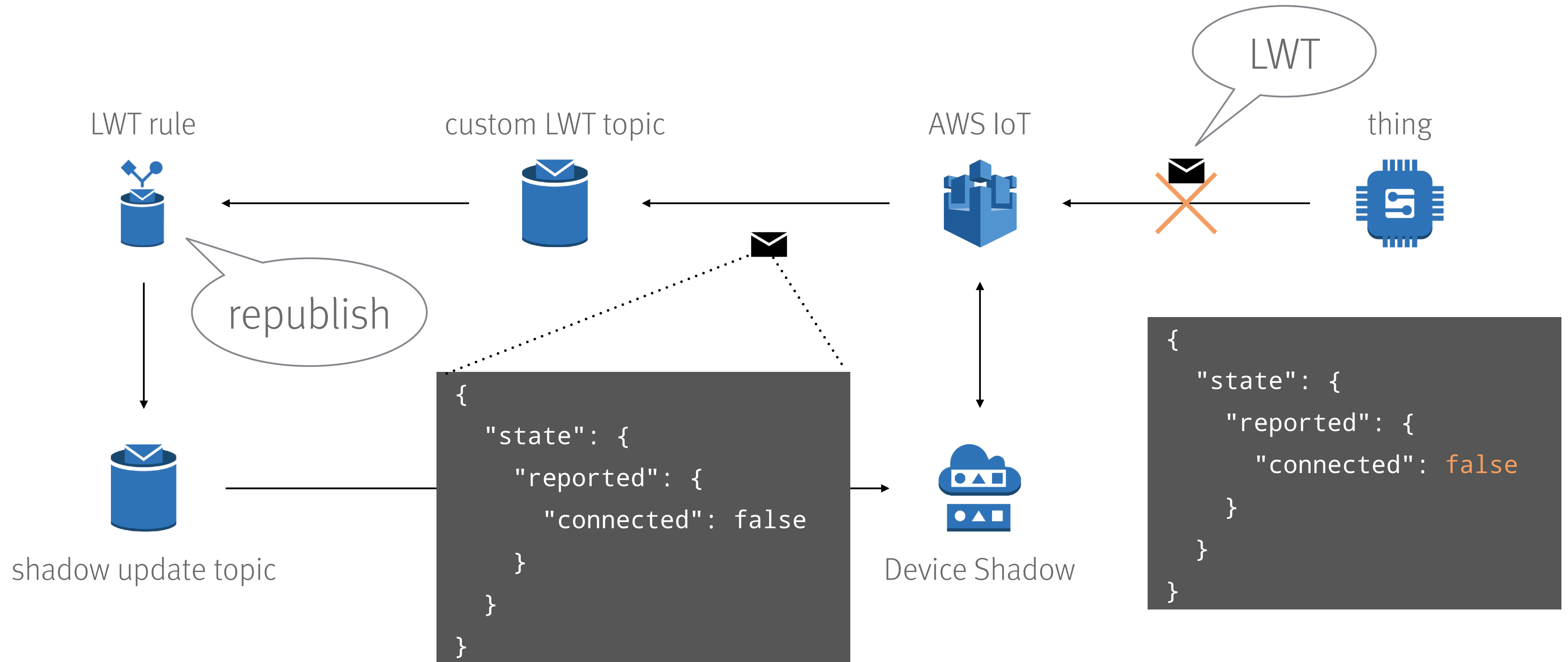
connected / disconnected / LWT



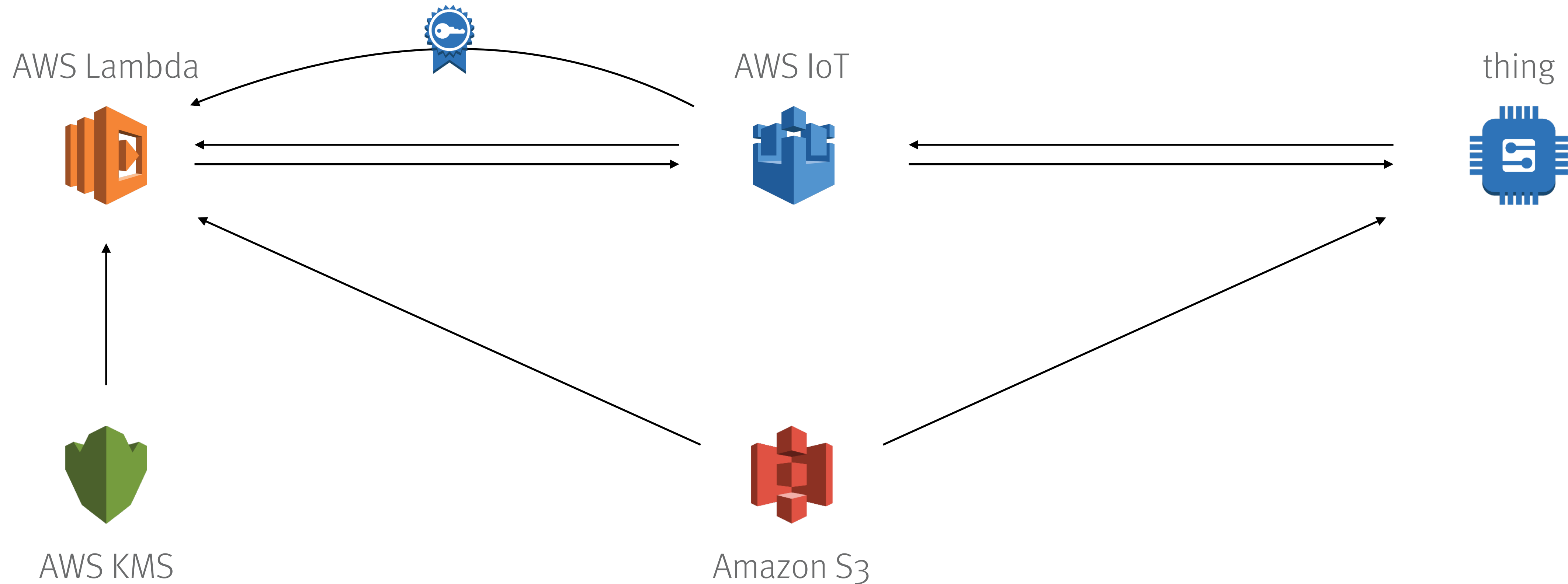
connected / disconnected / LWT



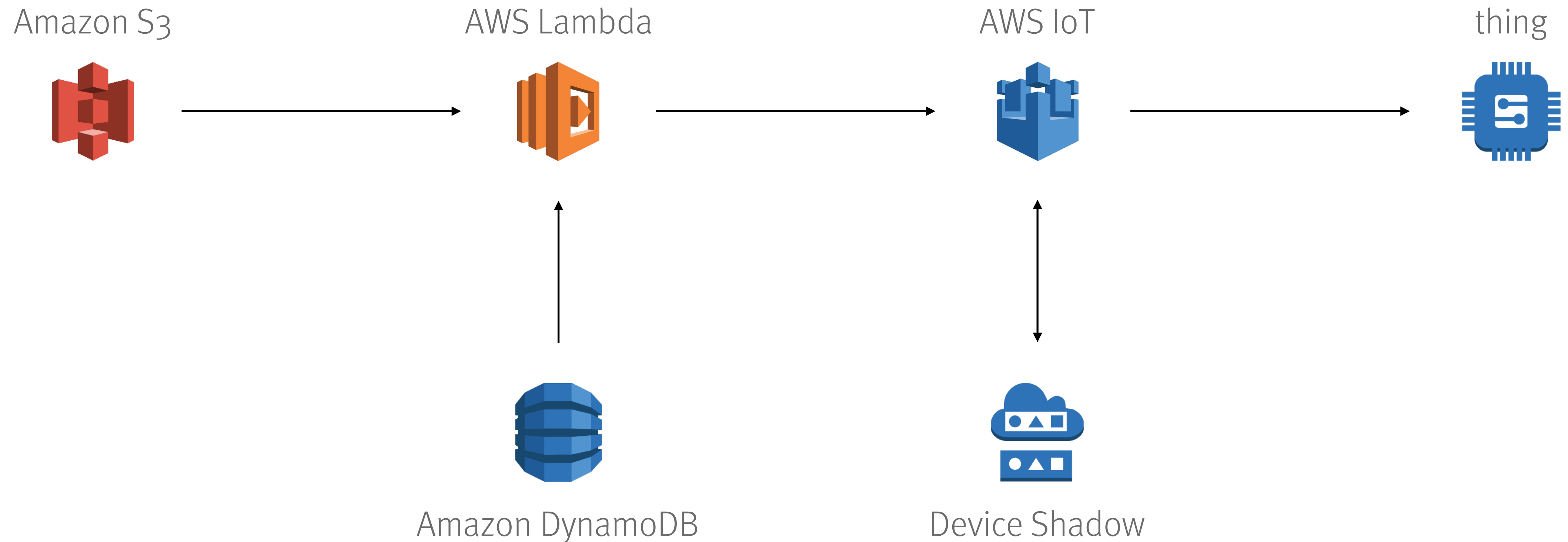
connected / disconnected / LWT



encrypted file transfer



firmware update



summary

- › scalable platform
- › common IoT use-cases
- › w/o own infrastructure
- › w/o upfront capacity planning
- › very secure
- › very extensible

Thank you.

Questions?

Comments

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