



Amazon Alexa: how can you build
a smart home which can talk to you?

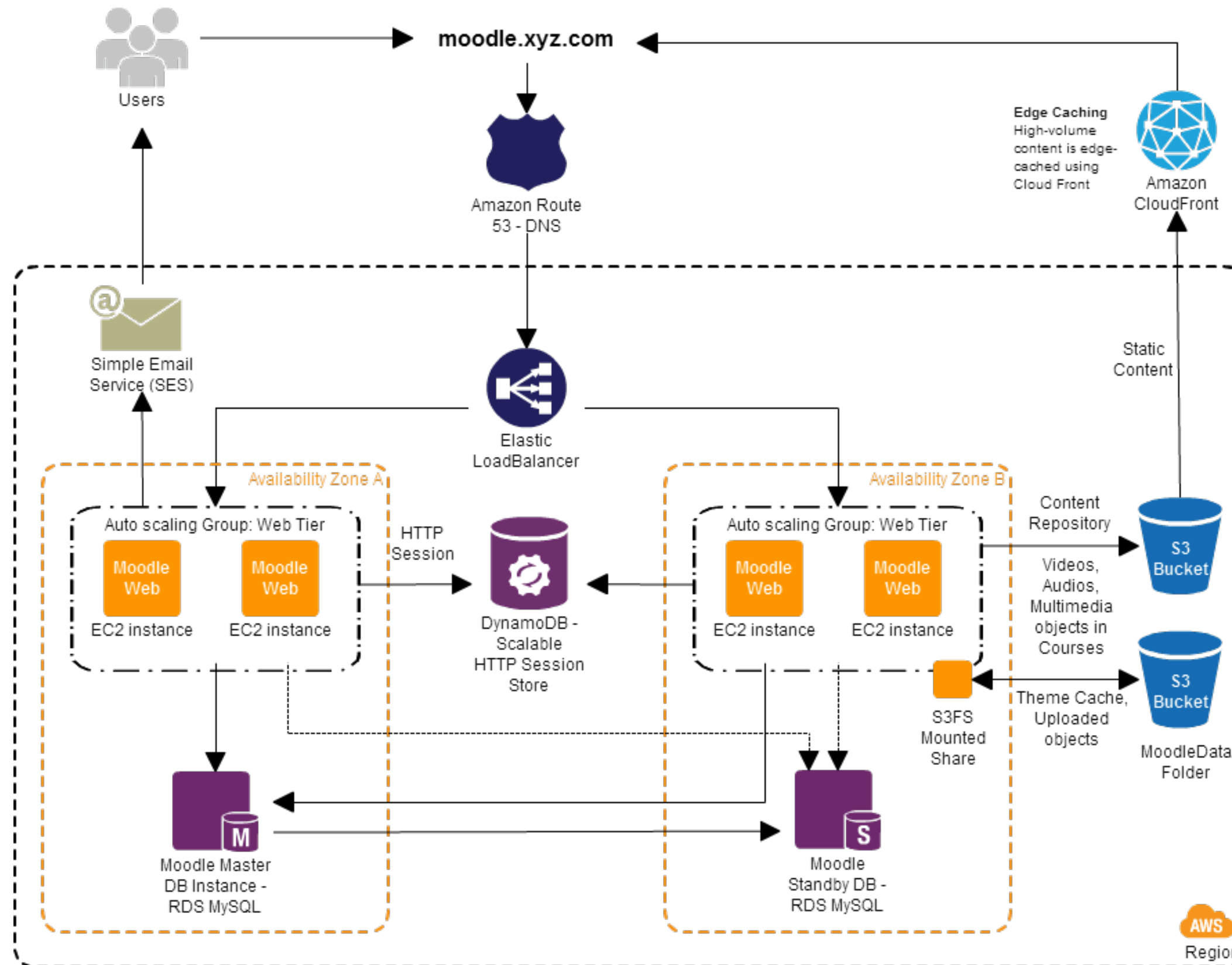
Tatyana Matvienko, DataArt

Agenda



- Amazon Web Services overview
- Alexa: smart voice intelligent assistant
- DeviceHive IoT communication framework
- Skills development portal: business logic
- End to end use case: from led strip lights to elevators

Simple Example



Compute

Amazon Elastic Compute Cloud (Amazon EC2)



Storage

Amazon Simple Storage Service (Amazon S3)



Amazon Elastic Block Storage (Amazon EBS)



AWS Import/Export



AWS Storage Gateway Service

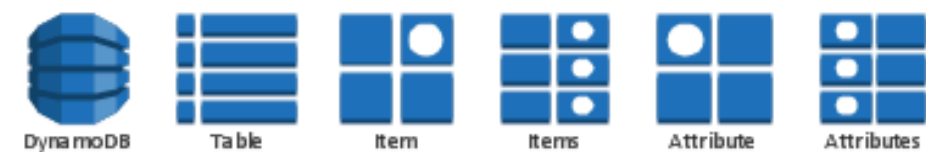


AWS Glacier



Database

Amazon DynamoDB



Amazon Relational Database Service (Amazon RDS)



Amazon ElastiCache



Networking

Amazon Route 53



Amazon Elastic Load Balancing



AWS Direct Connect



Amazon Virtual Private Cloud (VPC)



Content Delivery

Amazon Cloudfront



Elastic Network Instance



Application Services

Amazon Simple Queue Service (SQS)



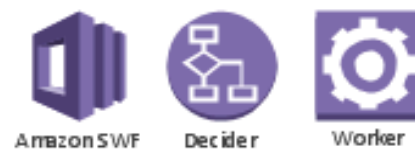
Amazon CloudSearch



Amazon Simple Email Service (SES)



Amazon Simple Workflow (SWF)



Amazon Simple Notification Service (SNS)



Deployment and Management

Amazon Elastic Beanstalk



AWS Identity and Access Management (IAM)

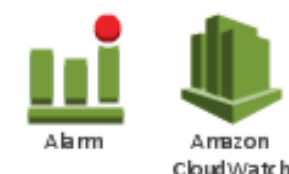


AWS CloudFormation



Monitoring

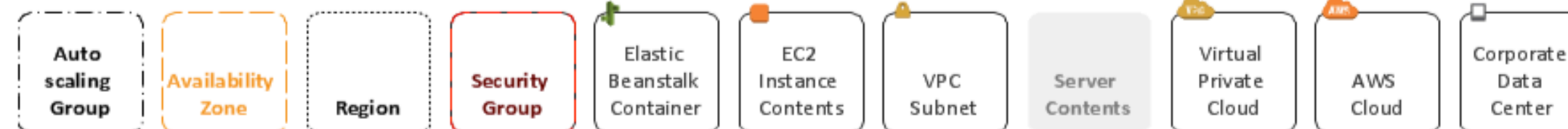
Amazon CloudWatch



Non-Service Specific



Groups





JUST ASK
amazon echo

What is Alexa?

- Alexa is the voice service that provides capabilities, or skills, that enable customers to interact with devices using voice.
- Officially supported Alexa enabled devices are Amazon Echo, Dot and Tap.
- Alexa runs in the cloud - devices stream data to Alexa Voice Service which transform audio to text and forwards to skills.
- Alexa is studying - the more you use it, the more she adapts to your voice, speech patterns, vocabulary and personal preferences.
- Skill logic could be developed in any language & web stack (Java, Node.js, Python, C#, Go, PHP)
- Skill could be hosted in any cloud or in your datacenter.

Alexa Human Language Technologies



- Automatic Speech Recognition
- Artificial Intelligence
- Natural Language Understanding
- Question Answering
- Dialog Management
- Text-To-Speech Processing



User

**Alexa Enabled Device /
Alexa Endpoint**

Amazon - Echo, Dot, Tap
Amazon Fire TV, Fire TV Stick
3rd Party – Tribby, Pebble Watch

Amazon Alexa Service

Wikipedia, Weather service,
Time service, Traffic update
service, Weather service,
Music service, News service,
etc.

Amazon Echo Show & Look



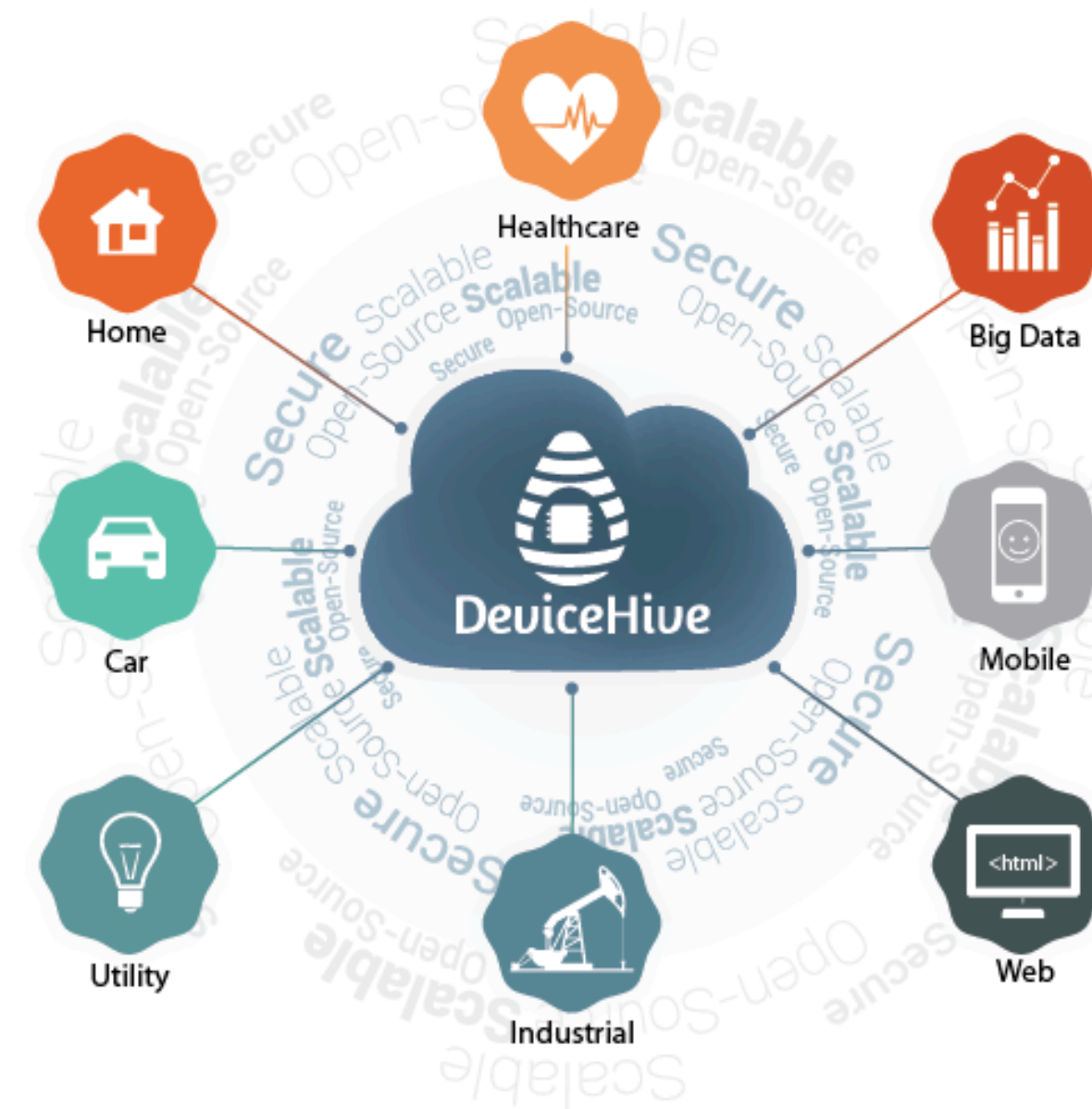
Hello, Smart Home



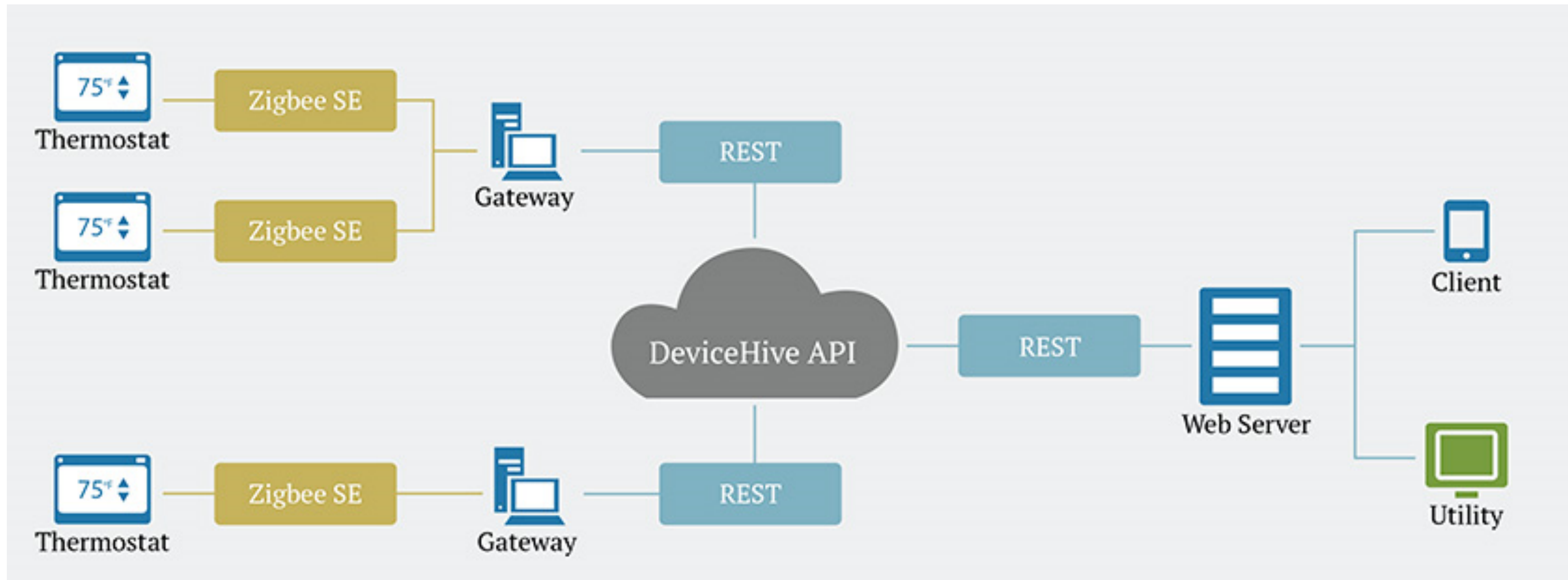
What is DeviceHive?



- Open source IoT data platform, built with microservices architecture in mind
- Python, Node and Java clients, ESP-firmware
- Security based on TLS and JWT authentication
- Cloud agnostic: supports public and private clouds, hybrid deployments
- Device agnostic: connect any device via REST, Websockets, MQTT
- Scalable: container-based service, managed by Docker, Docker-compose or Kubernetes
- Customizable: subscribe to messages you need and implement your business logic



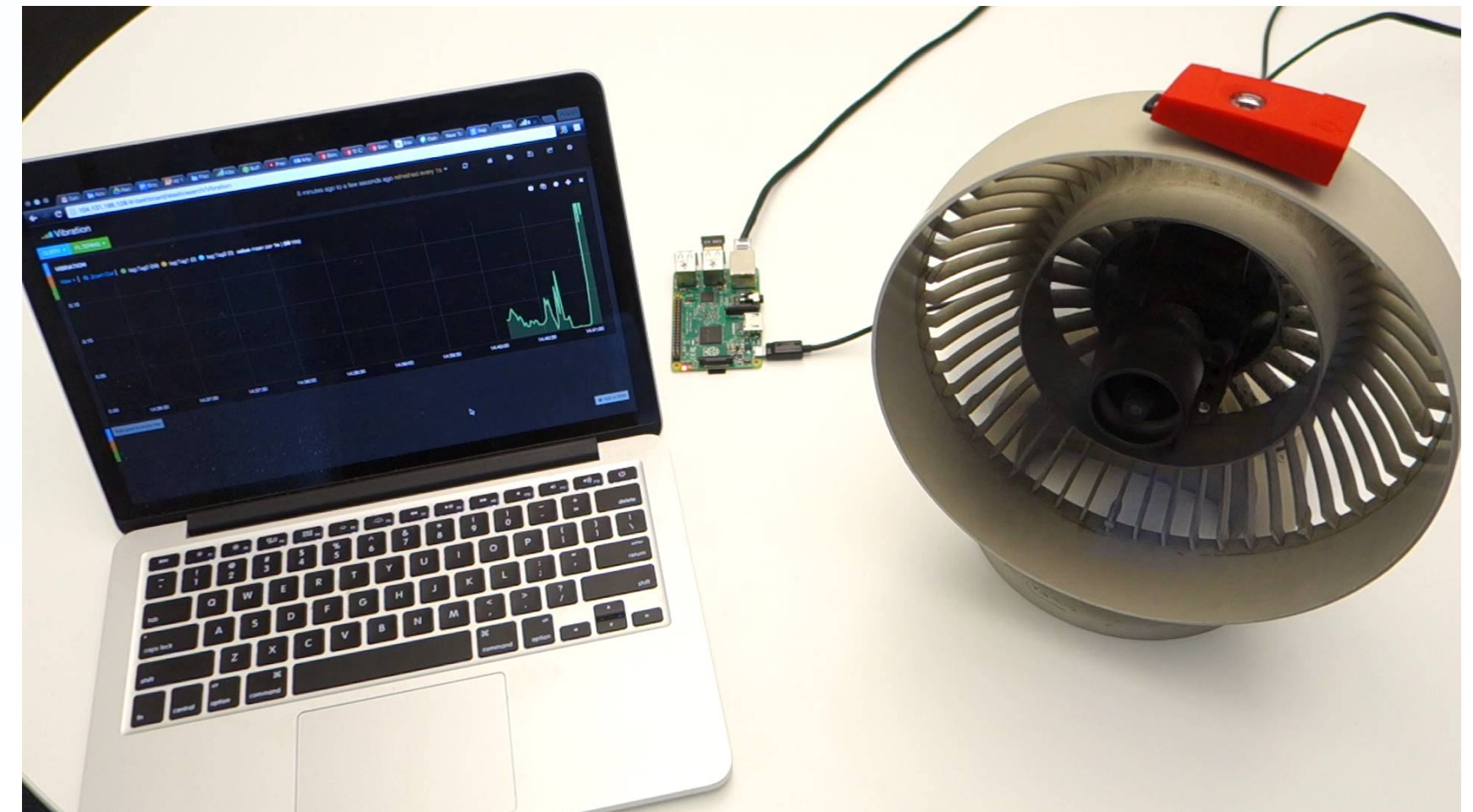
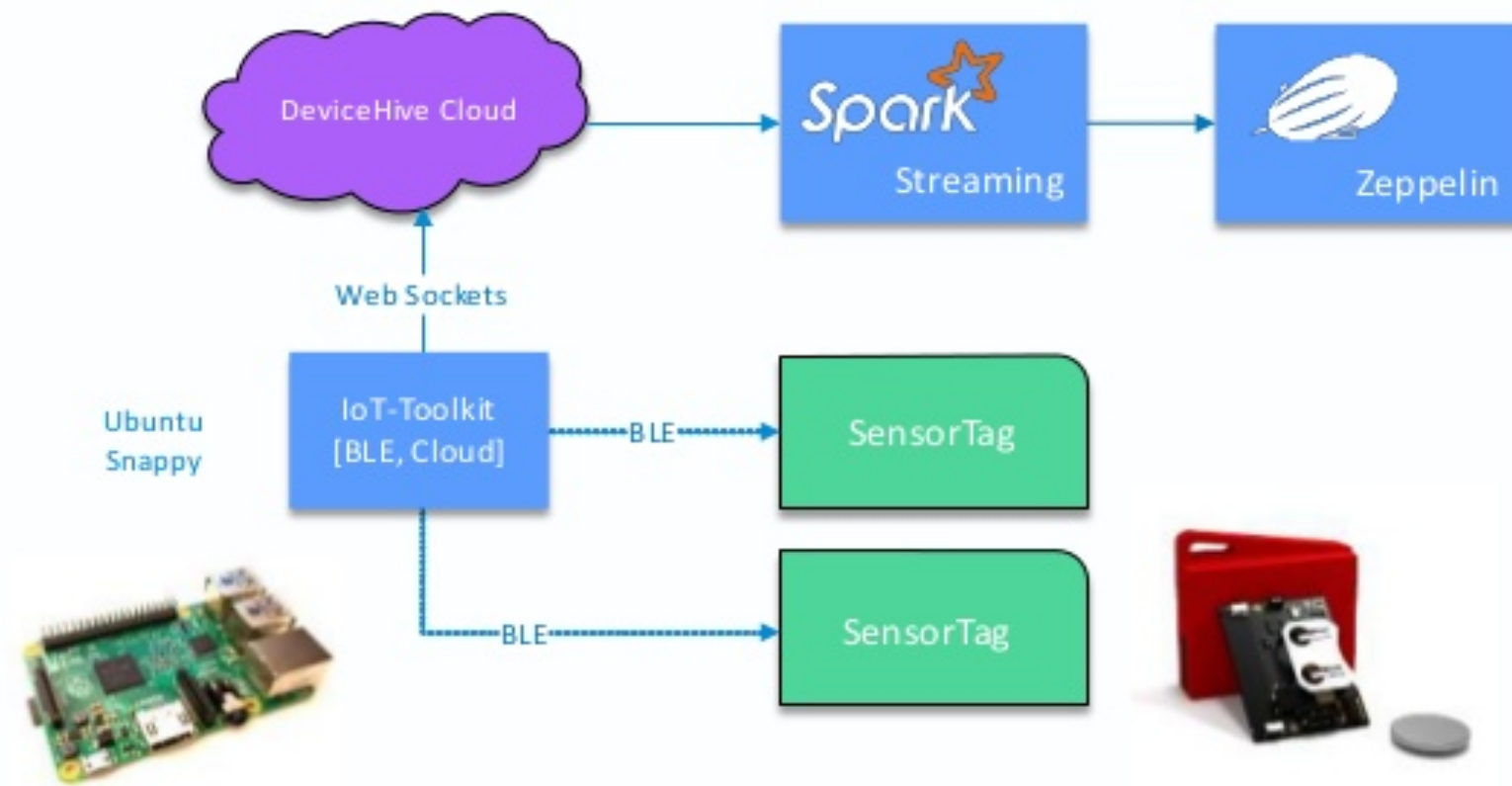
DeviceHive Smart Home



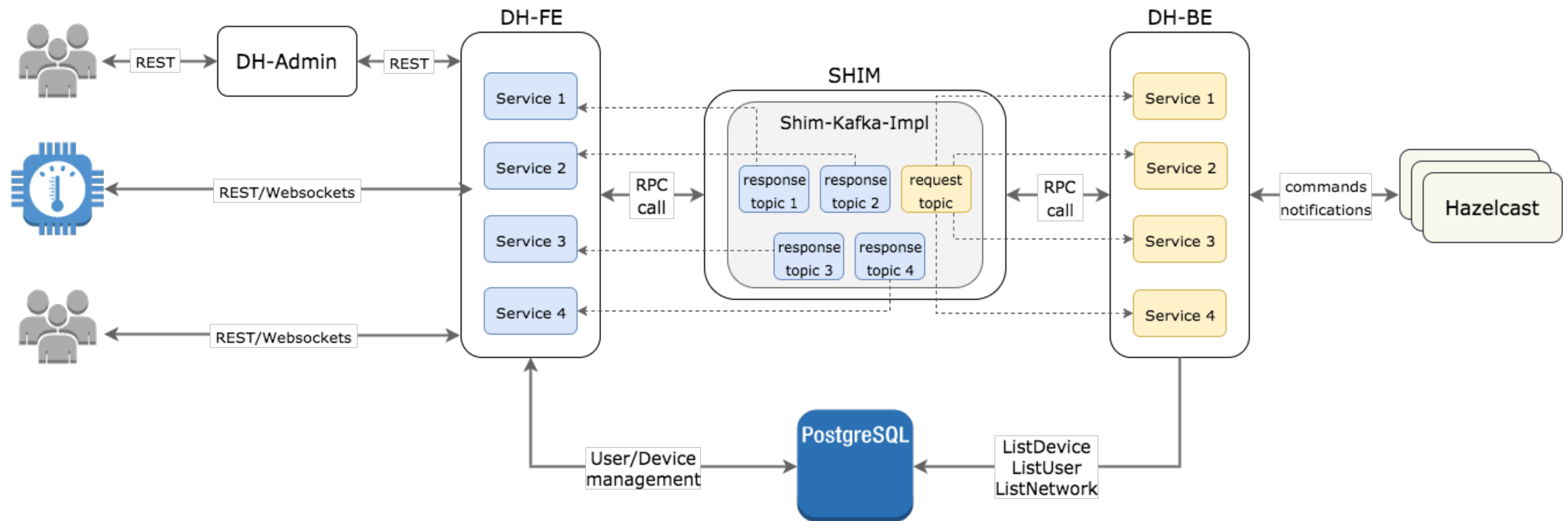
DeviceHive Smart Watches



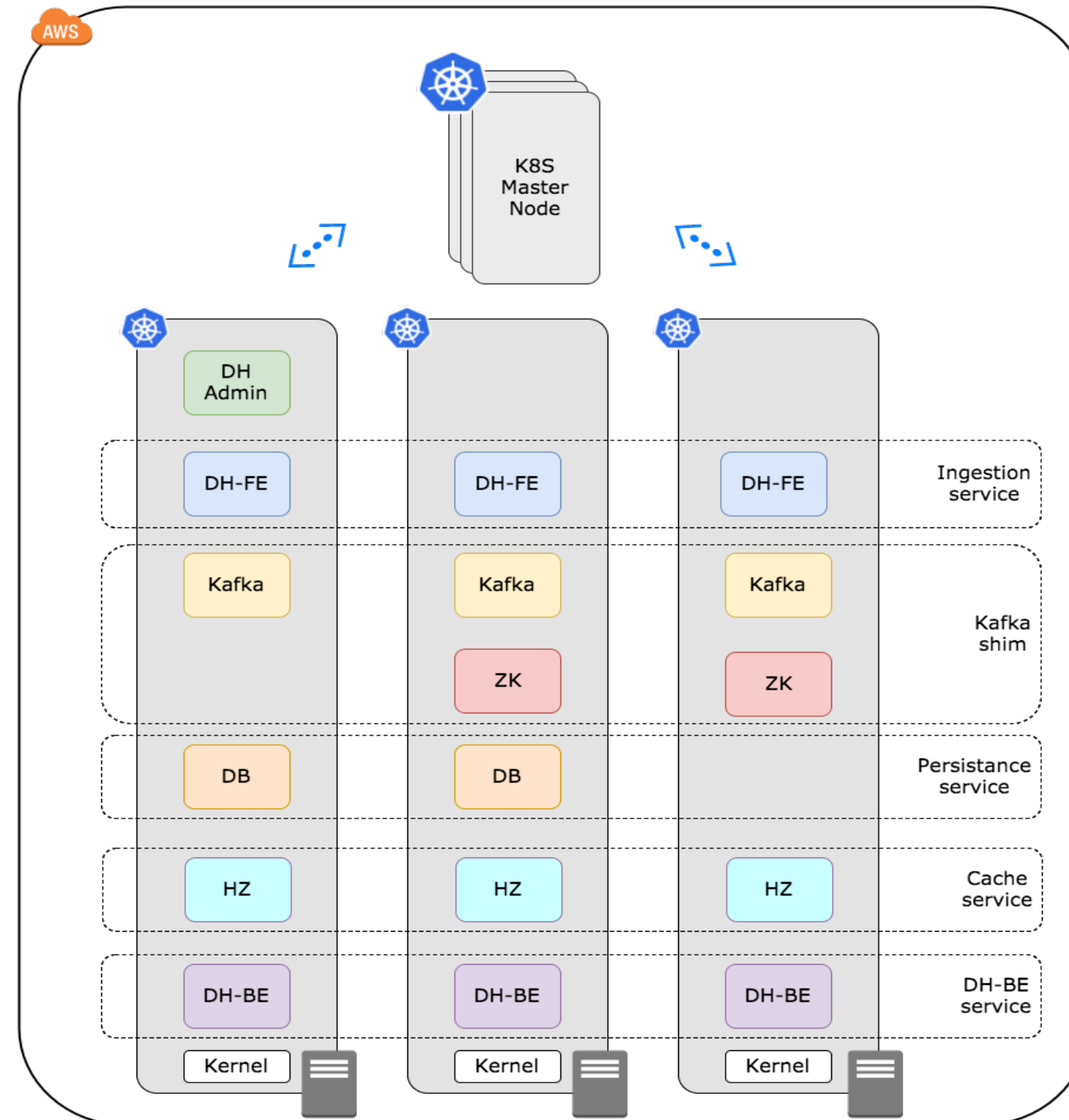
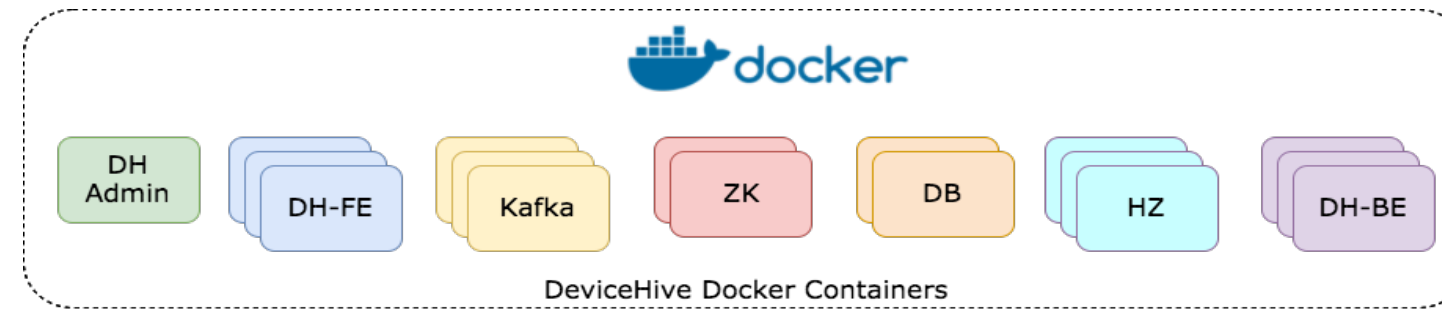
DeviceHive Predictive Maintenance

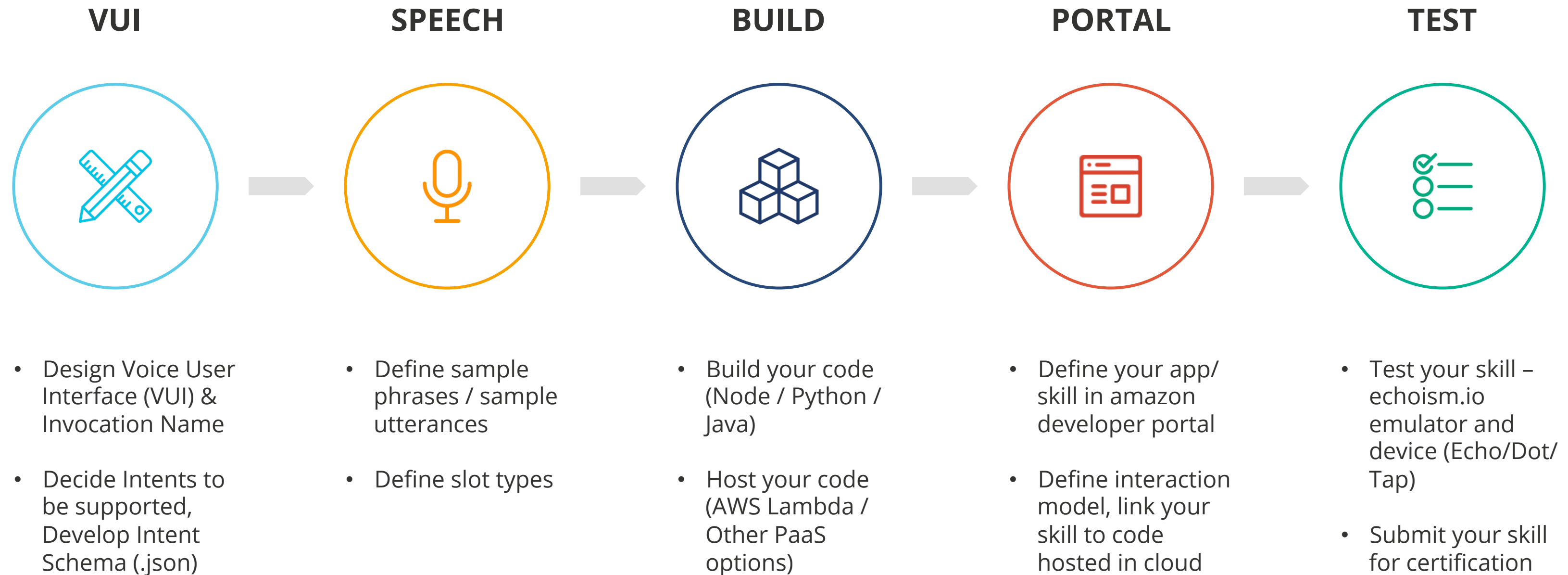


Microservices architecture

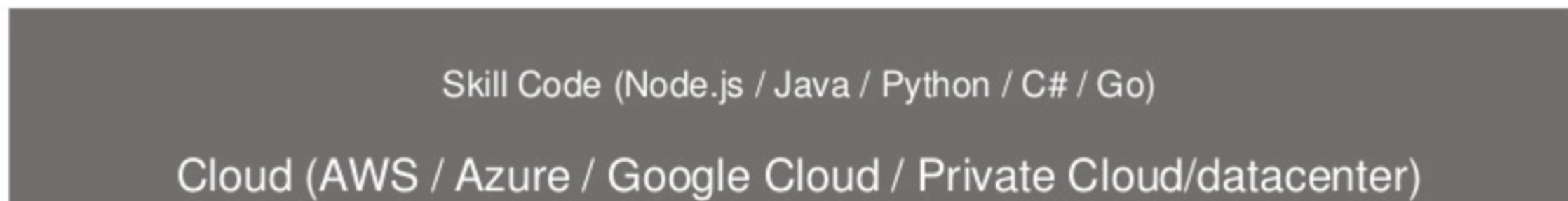
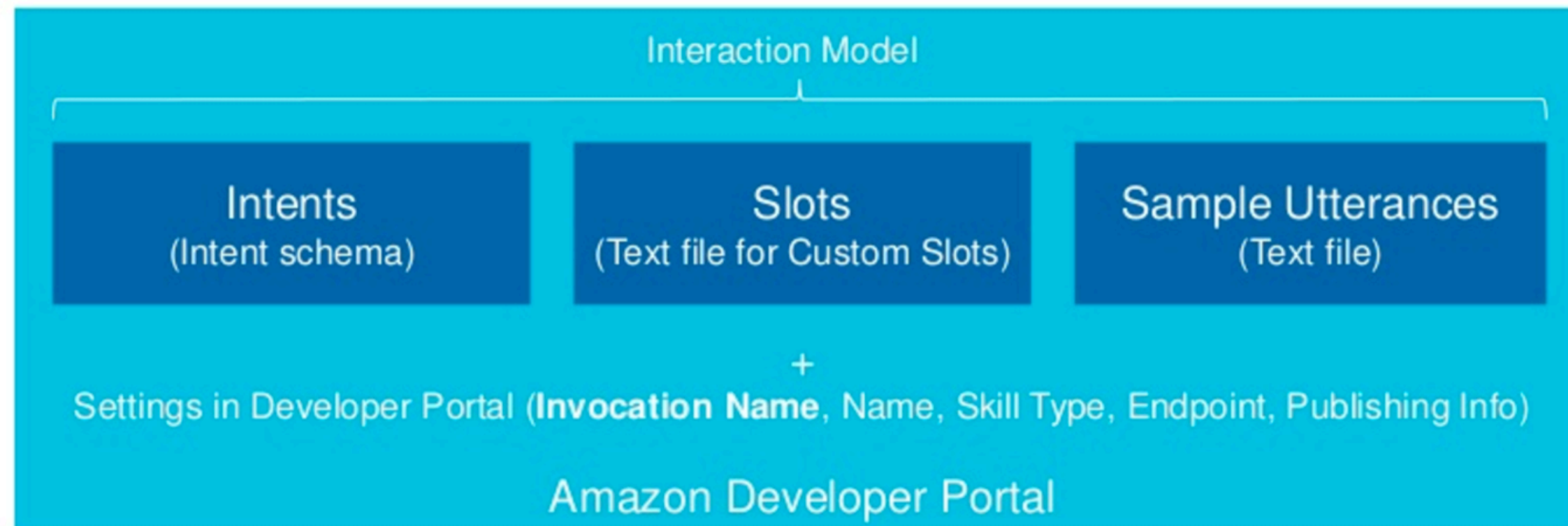


Deployment. Orchestration





Skill components



Intents



- Specific requests, questions or commands
- What your service will handle
- All skills have intents, at least one
- Each intent has specific method in your service that is called

Example: *'Alexa, ask Alarmy to set up the alarm at 7.30 pm'*

'Alexa, ask HowWeather what's the probability of rain today'

Intent	Common Utterances	Purpose
AMAZON.CancelIntent	<ul style="list-style-type: none"> •cancel •never mind •forget it 	Either of the following: <ul style="list-style-type: none"> •Let the user cancel a transaction or task (but remain in the skill) •Let the user completely exit the skill
AMAZON.HelpIntent	<ul style="list-style-type: none"> •help •help me •can you help me 	Provide help about how to use the skill. See “Offer Help for Complex Skills” in the Voice Design Best Practices for guidelines about help text.
AMAZON.NextIntent	<ul style="list-style-type: none"> •next •skip •skip forward 	Let the user navigate to the next item in a list.
AMAZON.NoIntent	<ul style="list-style-type: none"> •no •no thanks 	Let the user provide a negative response to a yes/no question for confirmation.
AMAZON.PauseIntent	<ul style="list-style-type: none"> •pause •pause that 	Let the user pause an action in progress.
AMAZON.PreviousIntent	<ul style="list-style-type: none"> •go back •skip back •back up 	Let the user go back to a previous item in a list.
AMAZON.RepeatIntent	<ul style="list-style-type: none"> •repeat •say that again •repeat that 	Let the user request to repeat the last action.
AMAZON.ResumeIntent	<ul style="list-style-type: none"> •resume •continue •keep going 	Let the user resume or continue an action.
AMAZON.StartOverIntent	<ul style="list-style-type: none"> •start over •restart •start again 	Let the user request to restart an action, such as restarting a game or a transaction.
AMAZON.StopIntent	<ul style="list-style-type: none"> •stop •off •shut up 	Either of the following: <ul style="list-style-type: none"> •Let the user stop an action (but remain in the skill) •Let the user completely exit the skill See below for more about canceling and stopping.
AMAZON.YesIntent	<ul style="list-style-type: none"> •yes •yes please •sure 	Let the user provide a positive response to a yes/no question for confirmation.

Slots



... are variables passed to intents.

Built in types: Date, Duration, Number, US_City, US_State, Time..

Custom Slot types: used for items that are not covered by Amazon's built-in set of types and is recommended for most use cases where a slot value is one of a set of possible values.

Examples: Floor number, Horoscope, custom services etc.

Alexa, ask Schneider for nearest distributors in London

Wake Word

Invocation Name

Intent

Slot

Alexa, ask DigiSure for status of my last vehicle claim

Alexa, ask Myweather for temp

(No slot type specified – city is inferred as current location of user)

Wake Word could be configured to Alexa, Amazon or Echo

Other settings

Intent Schema

The schema of user intents in JSON format. For more information, see [Intent Schema](#).

Also see [built-in slots](#) and [built-in intents](#).

```
1 {
2   "intents": [
3     {
4       "intent": "AskIntent"
5     },
6     {
7       "slots": [
8         {
9           "name": "color",
10          "type": "LIST_OF_COLORS"
11        }
12      ]
13    }
14  ]
15 }
```


Custom Slot Types (Optional)

Custom slot types to be referenced by the Intent Schema and Sample Utterances. For general information about custom slots, see [Custom Slot Types](#).

Type	Values		
LIST_OF_COLORS	blue red green	Delete	Edit
LIST_OF_FLOORS	first second third fourth fifth sixth seventh eight...	Delete	Edit

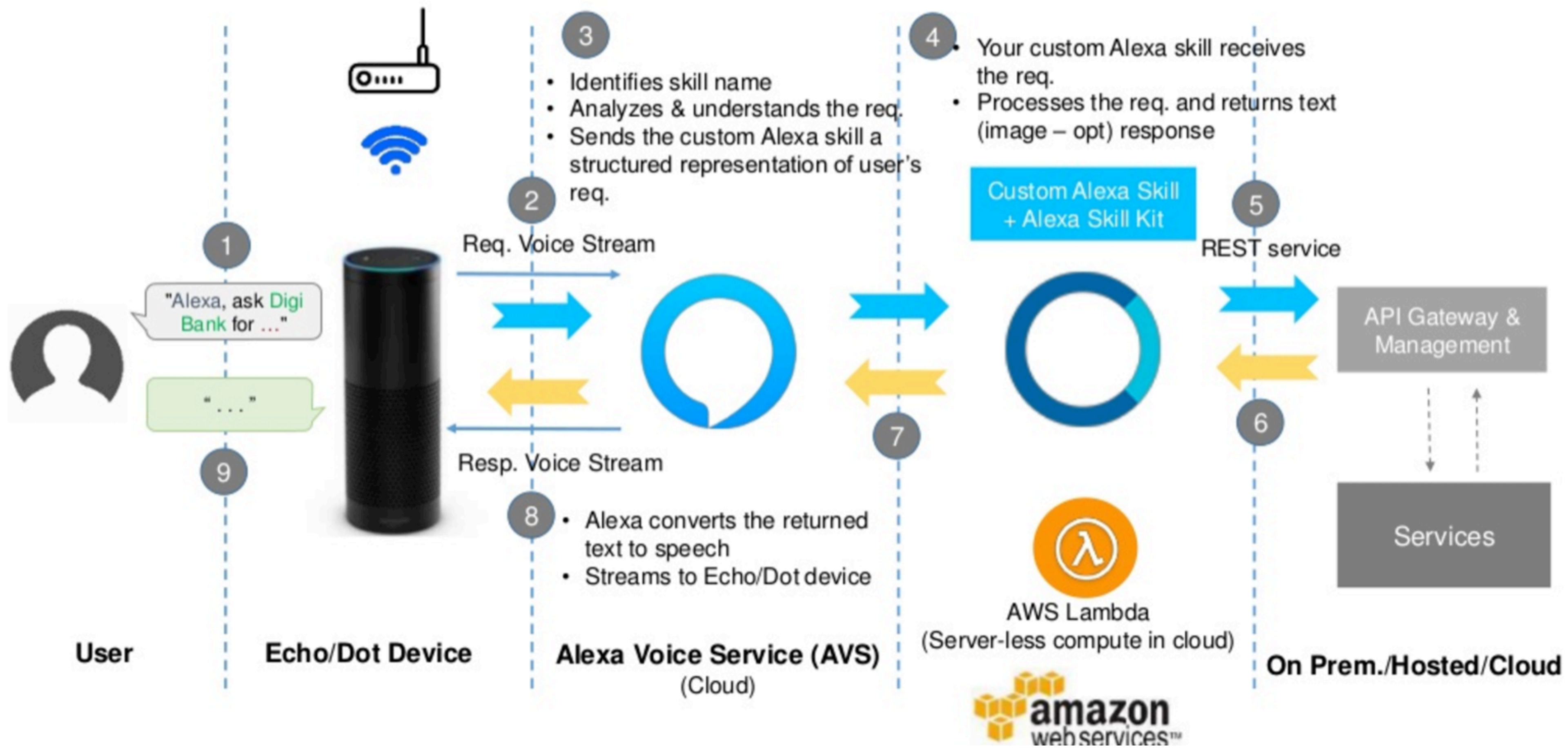
Add Slot Type

Sample Utterances

These are what people say to interact with your skill. Type or paste in all the ways that people can invoke the intents. [Learn more](#)

Up to 3 of these will be used as Example Phrases, which are hints to users.

```
1 AskIntent Tell me about the best solution for internet of things
2 TurnOnIntent turn on the {color} light
3 TurnOnIntent turn on the {color} light please
4 TurnOnIntent show us the {color} light
5 TurnOnIntent show us the {color} light please
6 TurnOnIntent turn on the {color} lamp
7 TurnOnIntent turn on the {color} lamp please
8 TurnOnIntent show us the {color} lamp
9 TurnOnIntent show us the {color} lamp please
10 TurnOnStripIntent turn on the light strip
11 TurnOnStripIntent turn on the light strip for me
```



Hosting options



AWS (Lambda, EC2, API Gateway, Elastic Beanstalk)

Azure (Functions, Web App Service)

Google Cloud Platform (Cloud Functions, App Engine)

Own/On Prem. (anything internet reachable with SSL and JSON response configured)



What Alexa can't do (now...)

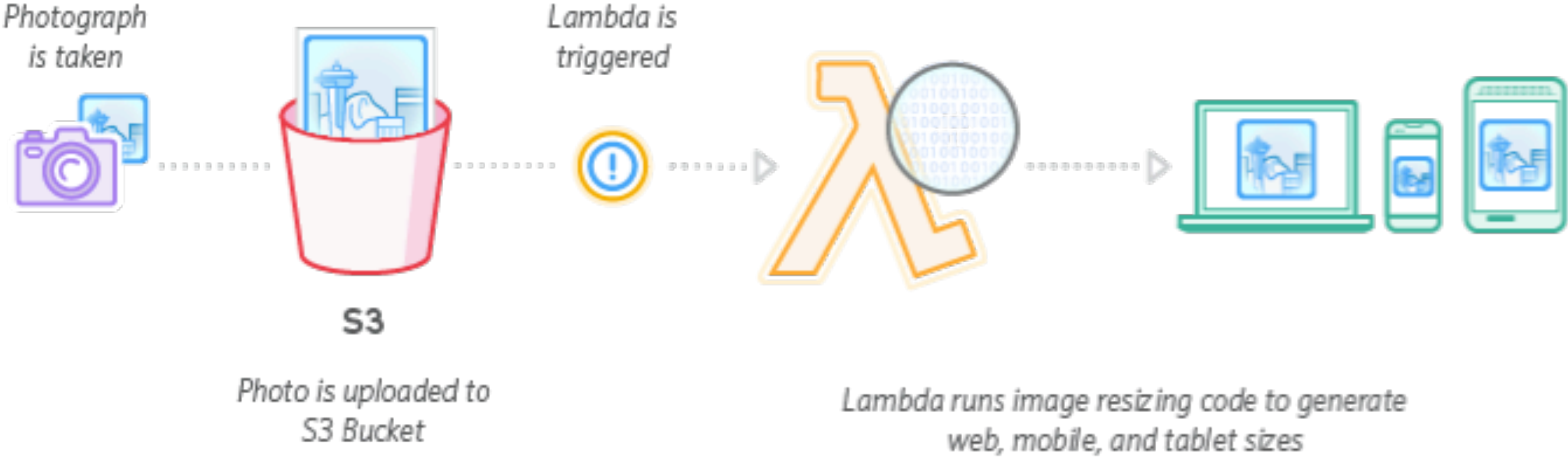


- Language processor
- Smartphone extension (any headset..)
- Multi-device sync
- Much security

AWS Lambda

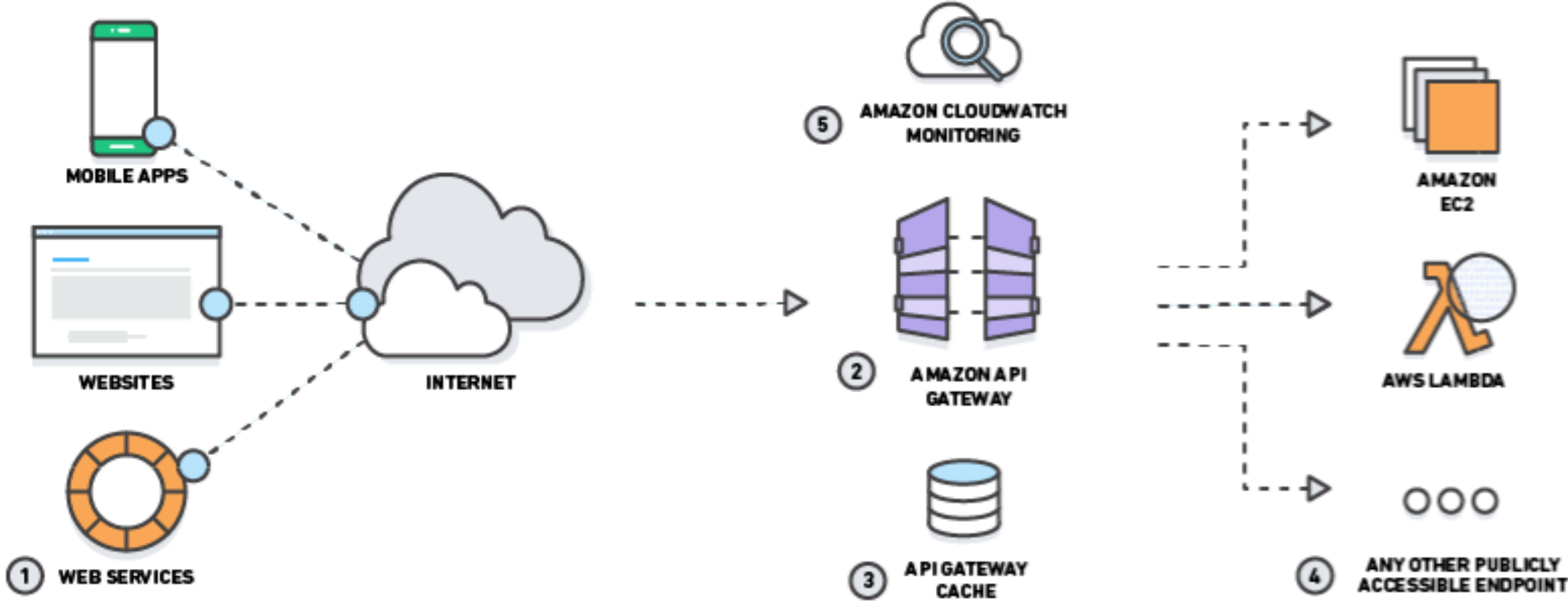
- Serverless compute option from AWS
- Event driven – executes code on demand as specified event is triggered
- Allows scaling without thinking of servers or nodes

Example: Image Thumbnail Creation



API Gateway

- Creates fully-managed secure API at any scale
- Provides an ability to access AWS services in convenient way





Echosim.io
COMMUNITY EDITION BETA

[Log In](#) [Resources](#) [Help](#)

Alexa Skill Testing Tool

An Amazon account is required. Log in with Amazon.

 Login with Amazon



Solution



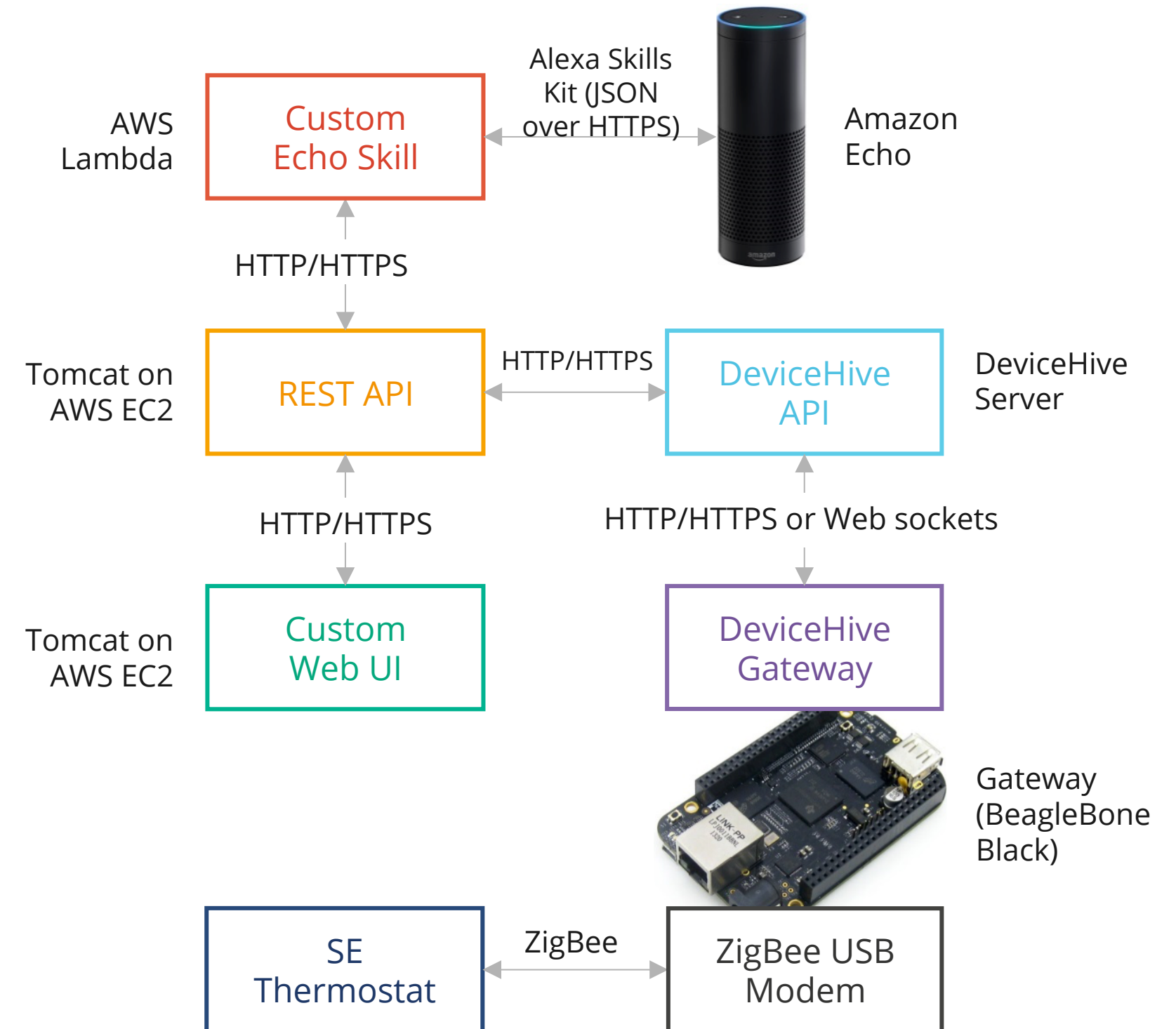
Client

Worldwide hotel and hospitality network

Cloud-based and highly scalable system on Amazon Web Services and DeviceHive

Fully secured solution with HTTPS/
WebSocket communication protocols

Scalable, fault tolerant, flexible architecture



DEMO

