AWS re:Invent

IOT211-R

Building voice-controlled home devices with AWS IoT and Amazon Alexa

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Agenda

- Overview of
  - AWS IoT services
  - Alexa Skills Kit
- Architecture review
- Hands-on implementation
- Questions

AWS IoT services

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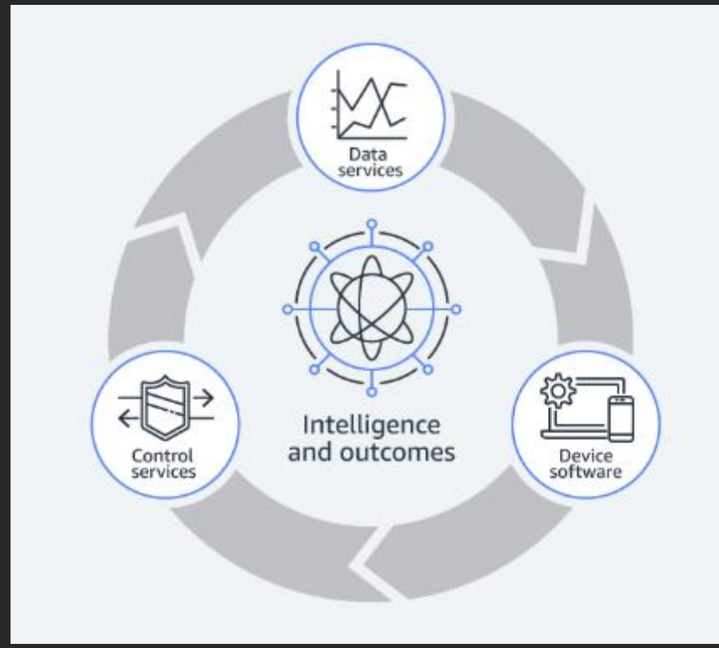
AWS IoT services

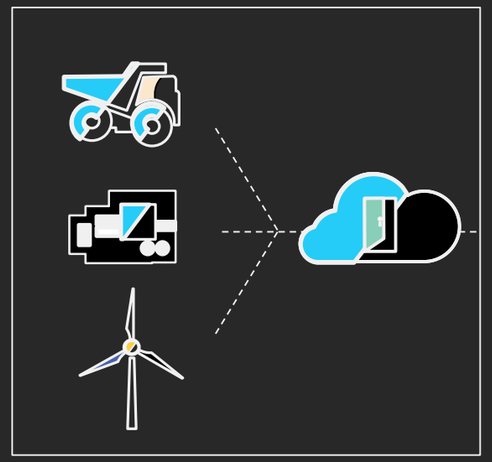
- Device software
  - Amazon FreeRTOS
  - AWS IoT Greengrass
- Analytic services
  - AWS IoT Analytics
  - AWS IoT Events
  - AWS IoT SiteWise
- Control services
  - AWS IoT Core
  - AWS IoT Device Defender
  - AWS IoT Device Management
  - AWS IoT Things Graph



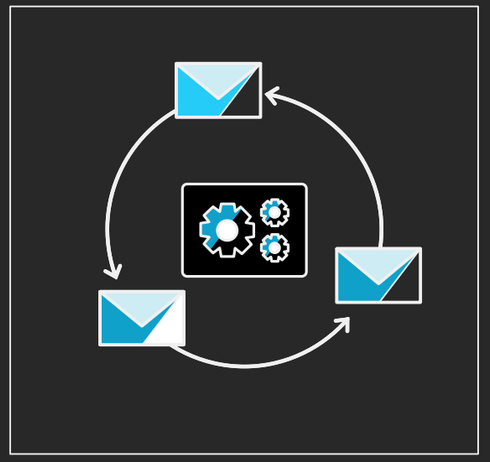
AWS IoT Core

Secure device connectivity and messaging

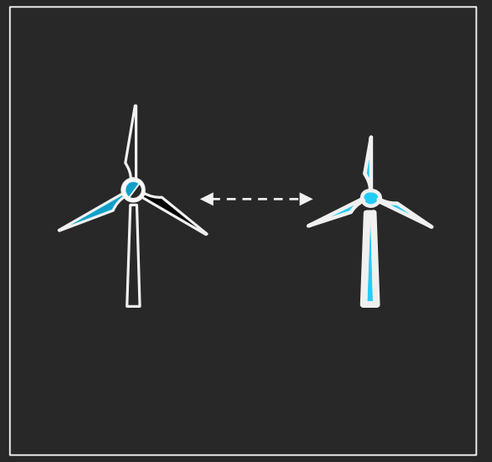
AWS IoT Core is a managed service that lets connected devices easily and securely interact with cloud applications and other devices



To securely connect devices to the AWS cloud and other devices at scale



To route, process, and act upon data from connected devices



To enable applications to interact with devices even when they are offline

To fully integrate with other AWS services to reason on top of the data
(analytics, databases, AI, etc.)

MQTT topics

- Ephemeral
- Publish/subscribe
- Wildcards
  - Single-level (*)
    - myhome/groundfloor/*/temperature
  - Multi-level (#)
    - myhome/groundfloor/#

New Alexa IoT service

New in 2019

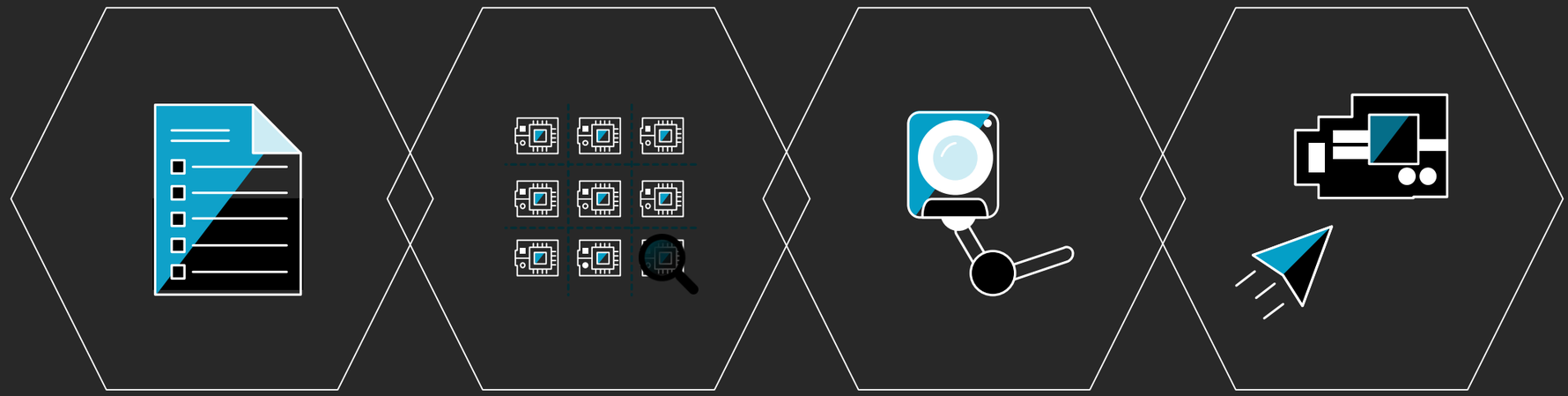
- Alexa Voice Service (AVS) Integration for AWS IoT Core
  - Suite of development tools to develop Alexa enable hardware
  - C++ SDK
  - ~ 50 MB RAM

- Resource constrained devices needed a solution
  - Offloaded software stack to cloud
  - ~ 1 MB RAM

AWS IoT Device Management

Device management service

AWS IoT Device Management helps you onboard, organize, monitor, and remotely manage your growing number of connected devices



Batch fleet provisioning

Real-time fleet index & search

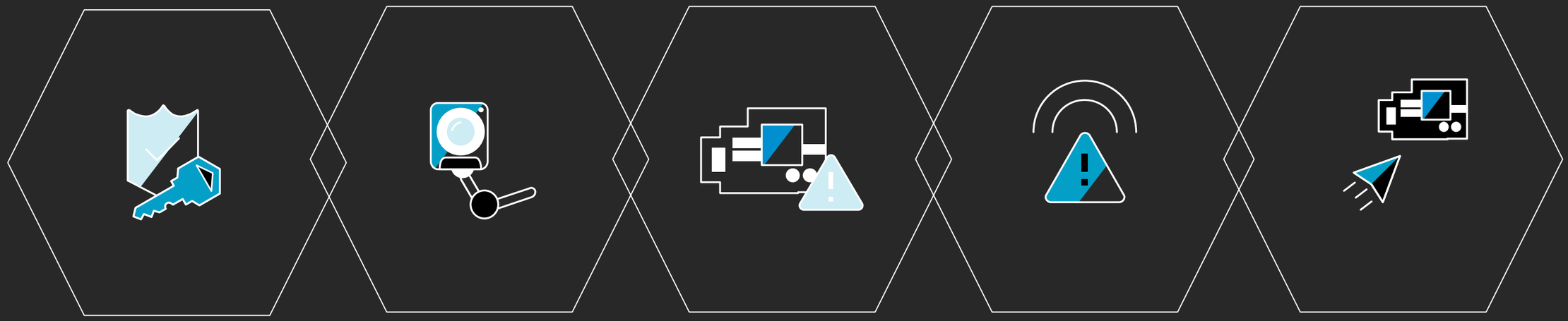
Fine-grained device logging & monitoring

Over-the-air updates

AWS IoT Device Defender

Device security

AWS IoT Device Defender is a fully managed IoT security service that enables you to secure your fleet of connected devices on an ongoing basis



Audit device configurations

Monitor device behavior

Identify anomalies

Generate alerts

Patch security vulnerabilities

Alexa Skills Kit

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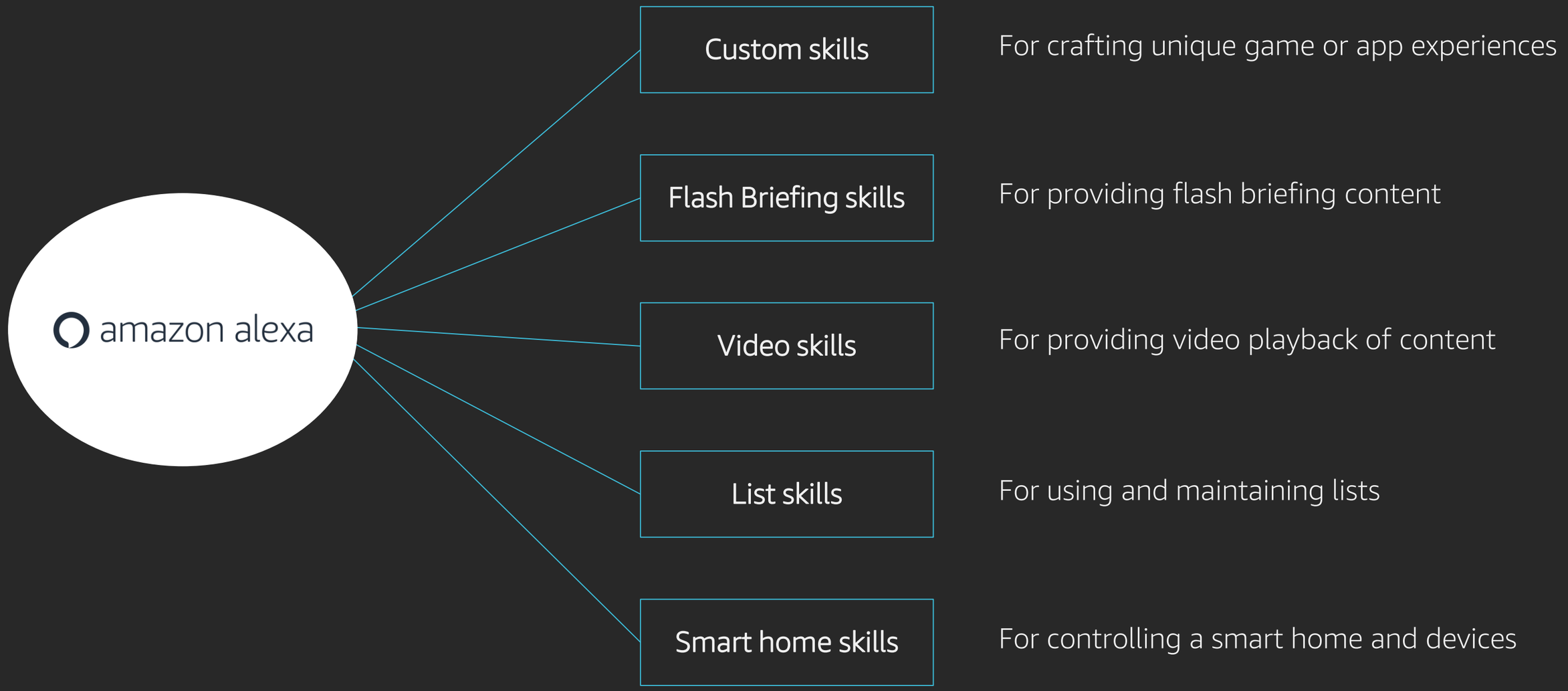
Alexa Skills Kit

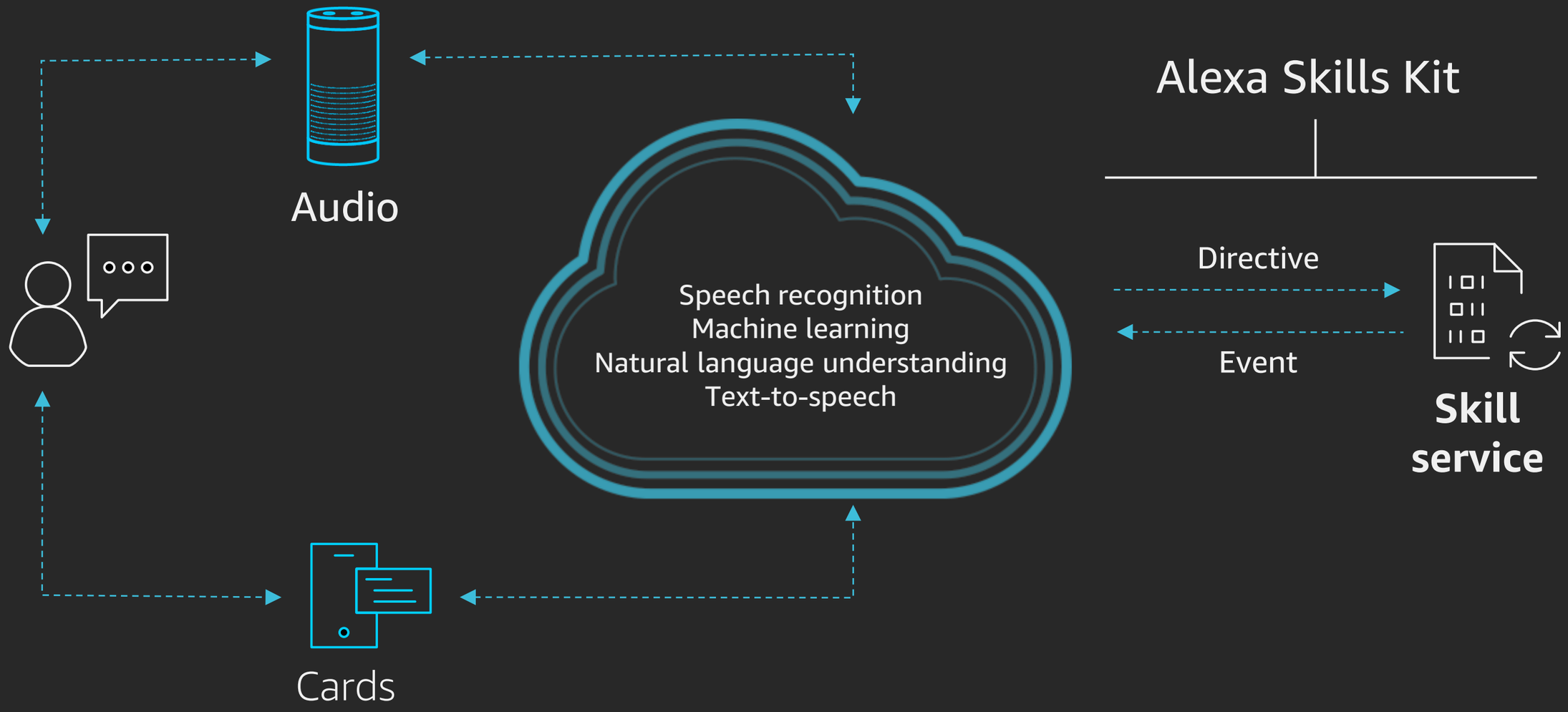
- The Alexa Skills Kit (ASK) lets you teach Alexa new skills
- It contains the documentation, tools, and sample code needed to build Alexa skills

  - https://developer.amazon.com/ask

Types of Alexa skills



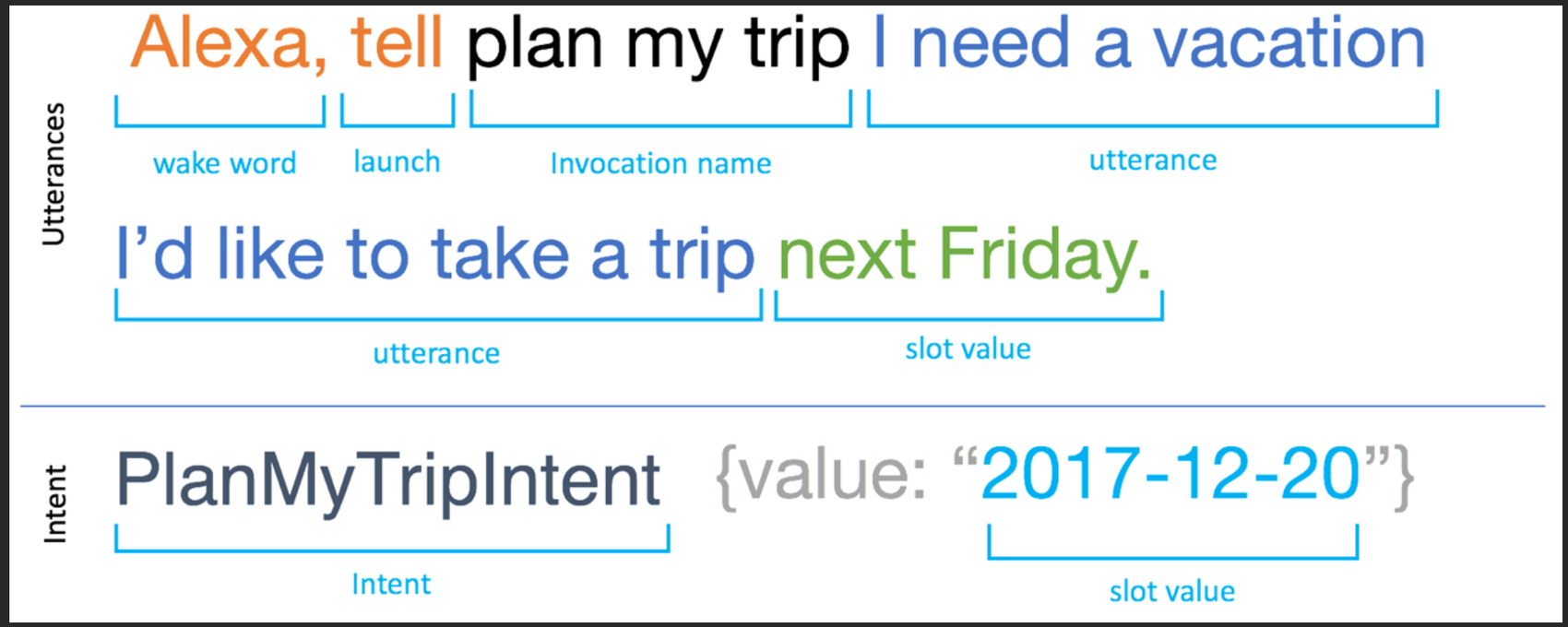
Alexa Skills Kit



Alexa skill components

Main components

- Invocation
- Intent
- Utterance



Scenario

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Smart hotel

Guests

- Set temperature
- *No authorization needed*

Staff

- Reset room
  - Close shades
  - Turn off television
  - Set temperature
  - Start smart vacuum
- *Needs authorization*

Architecture

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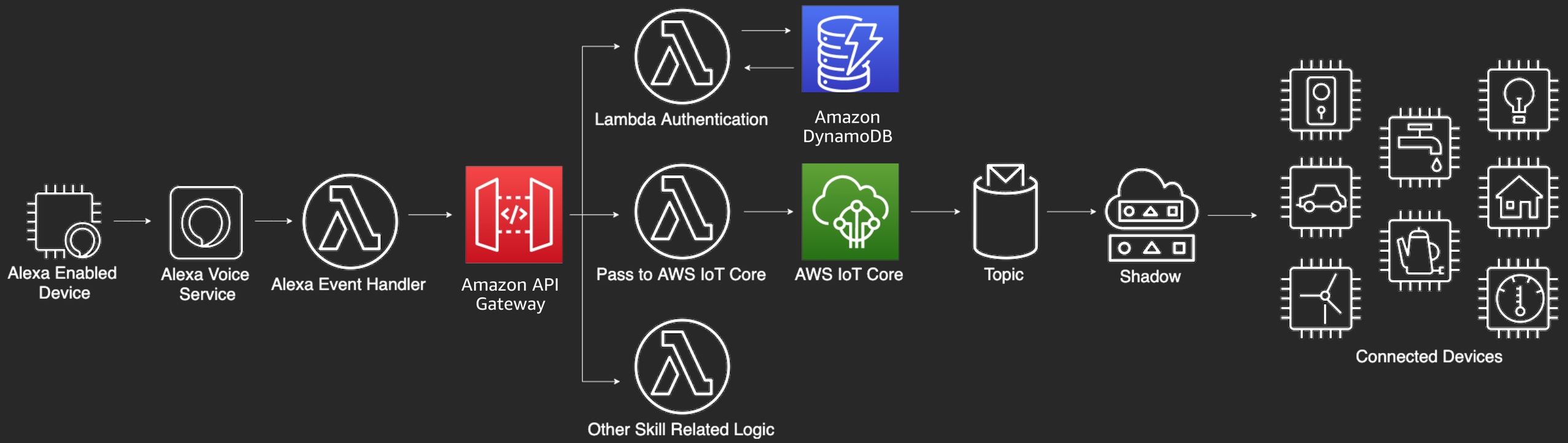
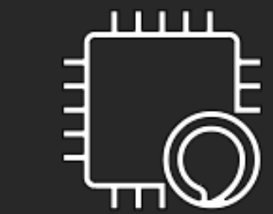
Architecture: Command smart devices with Alexa



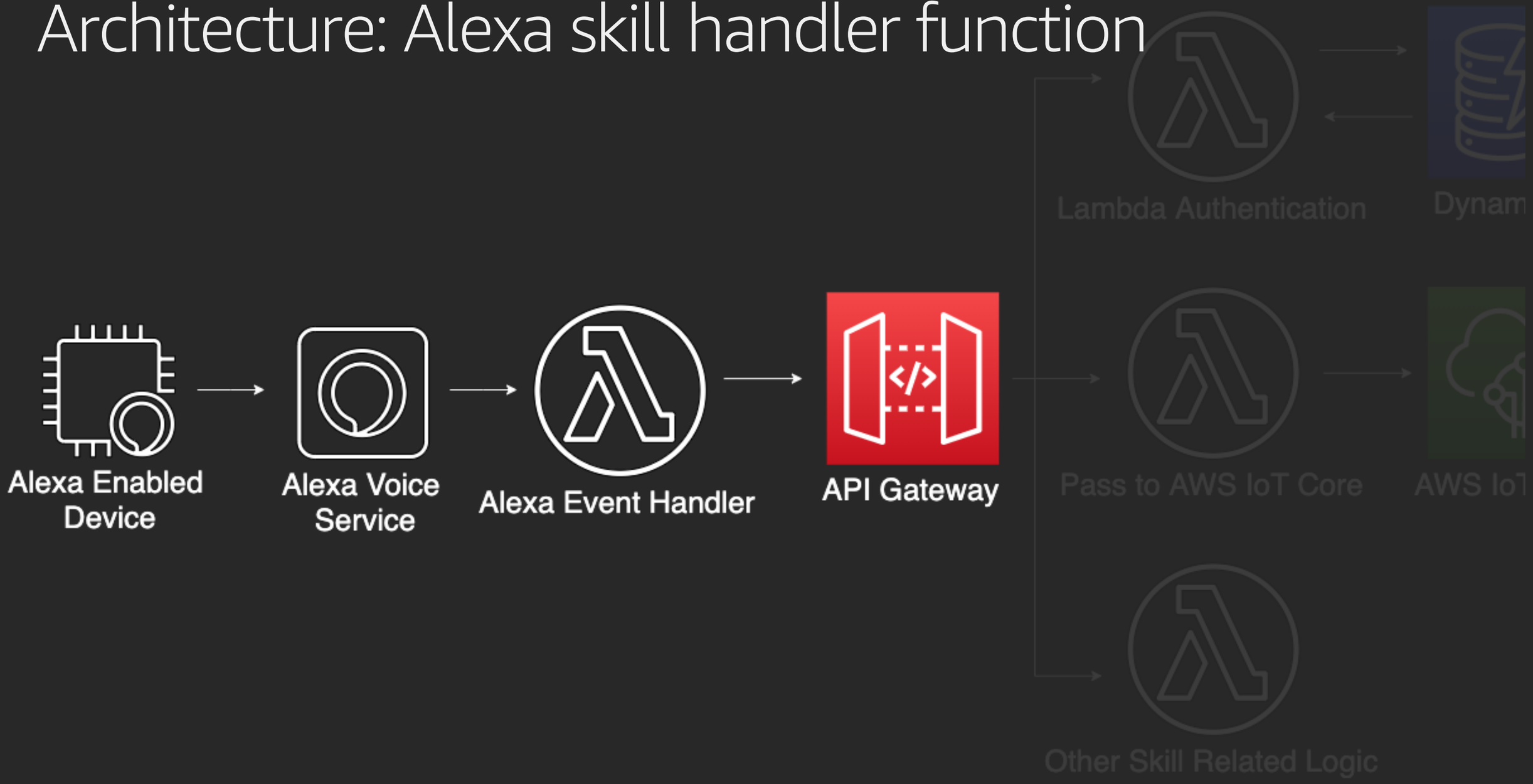
Architecture: Alexa-enabled device



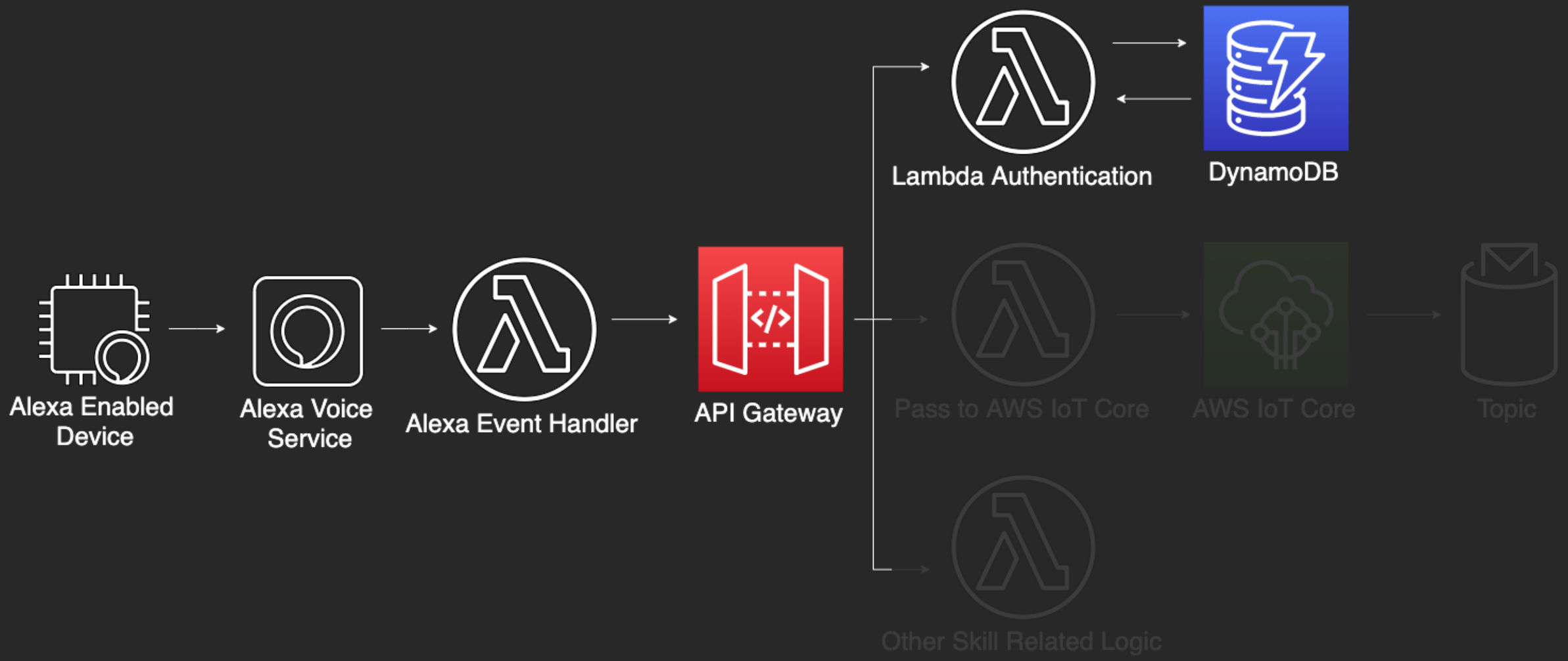
Alexa Enabled Device

Alexa Voice Service

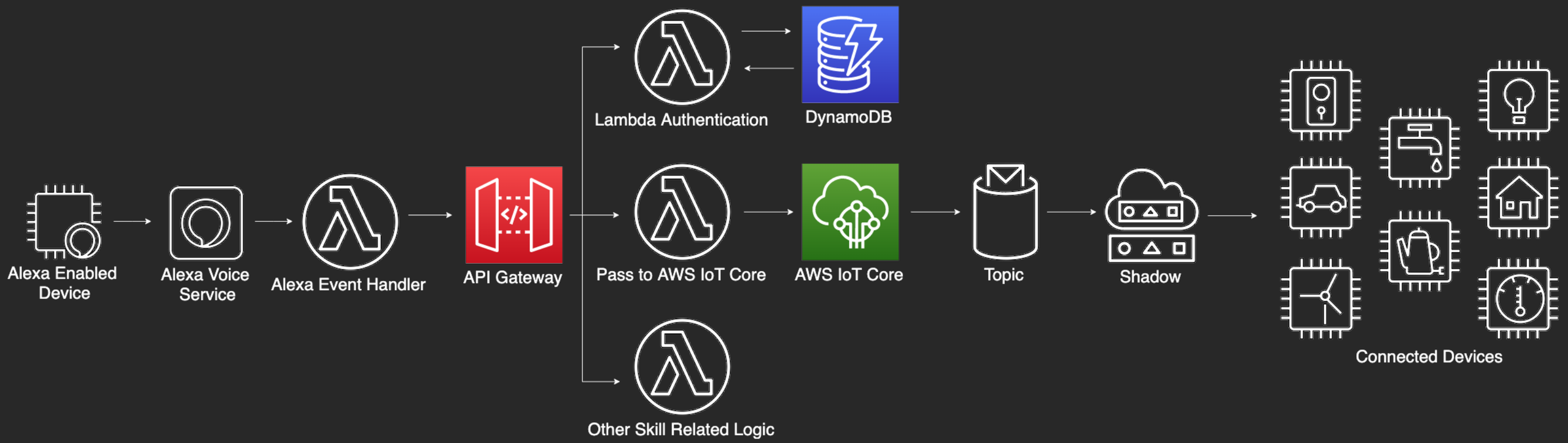
Architecture: Alexa skill handler function



Architecture: API Gateway and authorization



Architecture: AWS IoT Core



Let’s build

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Alexa Skills Kit

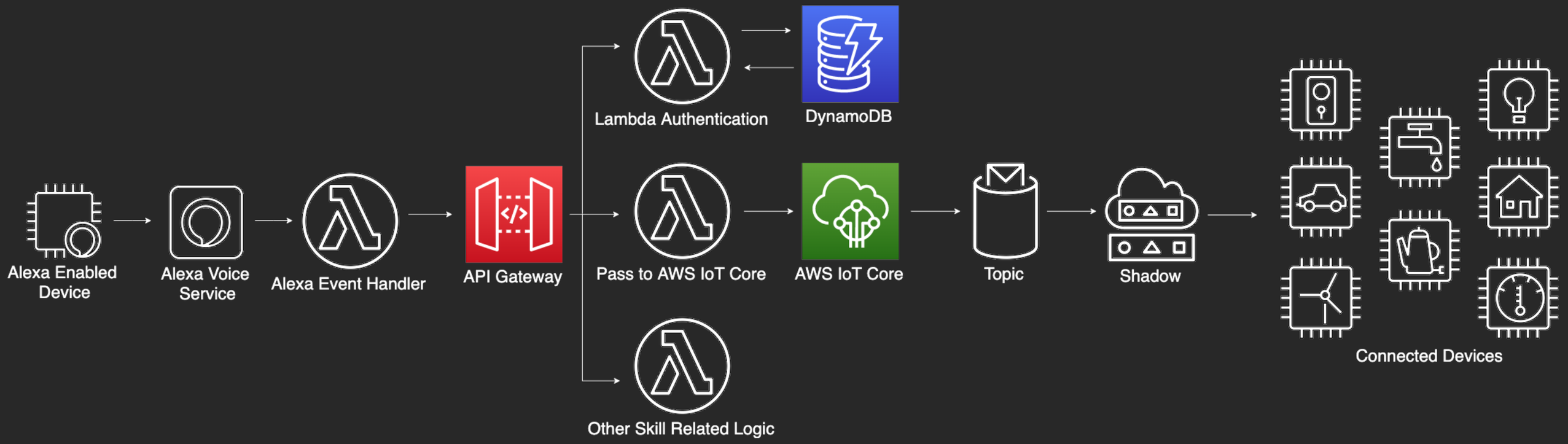
- Scenario – Smart hotel
- Two interactions flows
  - Set temperature (by anyone)
  - Reset room (by authorized users)
- Multiple utterances per intent
- Slots
  - Room number
  - Temperature

Hands on

https://voice-connected-devices.workshop.aws

Build AWS architecture

- Let’s walk through building it



Set temperature lambda

```
import json
import boto3
import datetime
timestamp = datetime.datetime.utcnow().strftime('%Y-%m-%dT%H:%M:%S.%f')
client = boto3.client('iot-data')


def lambda_handler(event, context):
     temp = event['multiValueQueryStringParameters']['temp'][0]
     print(event)
     roomId = 101
     response = client.publish(
          topic = 'setTemp’,
          qos = 1,
          payload = json.dumps({"roomid": roomId,
                    "timestamp": timestamp, "thermostat": temp })
     )
     return {
         "statusCode": 200,
     }
```

SetTemp topic payload

```
{
        "roomid": "412",
        "timestamp": "2019-10-11T21:26:51.393479",
        "thermostat": 72
}
```

Reset room lambda

```
import json
import boto3
import datetime
timestamp = datetime.datetime.utcnow().strftime('%Y-%m-%dT%H:%M:%S.%f')
client = boto3.client('iot-data')


def lambda_handler(event, context):
     roomId = event['multiValueQueryStringParameters']['room'][0]
     temp = 72


     response = client.publish(
          topic = 'resetRoom’,
          qos = 1,
          payload = json.dumps({"roomid": roomId, "timestamp": timestamp,
          "shades": "up", "theater": "stopped", "thermostat": temp})
          )


     return {
          "statusCode": 200,
     }
```

ResetRoom topic payload


```
{
        "roomid": "412",
        "timestamp": "2019-10-11T21:26:51.393479",
        "shades": "up",
        "theater": "stopped",
        "thermostat": 72
}
```

Related breakouts

ALX 201: How developers can build natural, extensible voice conversations

ALX 301: Build your own Raspberry Pi Alexa device, now with visuals

ALX 311: How to build Alexa skills with AWS database & storage services

ALX 405: Scaling a 30,000-line Alexa skill

IOT 203: Getting started with IoT security

IOT 208: What's new with AWS IoT analytics services?

IOT 219: Getting started with AWS IoT Events

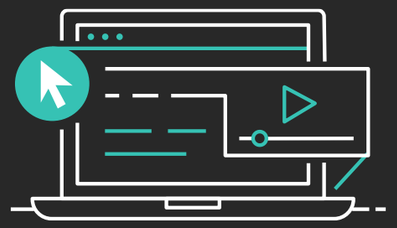
IOT 304: Building voice-controlled home devices with AWS IoT and Alexa

IOT 402: Building an AWS IoT-enabled drink dispenser

Learn IoT with AWS Training and Certification

Resources created by the experts at AWS to help you build IoT skills

Take the free digital curriculum, Internet of Things (IoT) Foundation Series, to build IoT skills and work through common scenarios



25+ additional free digital courses cover topics related to IoT, including:

- AWS IoT Core
- AWS IoT Greengrass
- AWS IoT Analytics
- AWS IoT Device Management
- AWS IoT Events

Visit the Learning Library at https://aws.training

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aws training and certification

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