
AWS
re:Invent
NOV. 28 – DEC. 2, 2022 | LAS VEGAS, NV

IOT315

Choosing between named and classic shadows for distinct IoT use cases

Rajat Mathur (he/him)

Senior Solutions Architect
AWS

Andrew Chen (he/him)

Senior Product Manager Tech
AWS – AWS IoT

© 2022, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Agenda

Intro to AWS IoT Device Shadow service

Device shadow workflow

Limitations of classic shadows

Named shadow feature

Named shadow design approaches

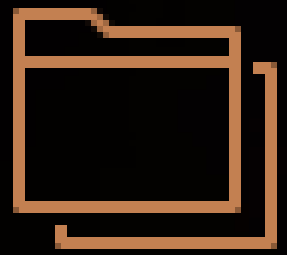
iRobot case study

Innovation that AWS Partners are driving

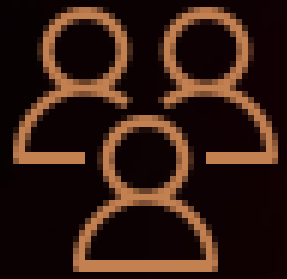
© 2022, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Intro to AWS IoT Device Shadow service

The AWS IoT Device Shadow service enables the cloud and mobile applications to easily interact with connected and registered devices that may have intermittent access issues with AWS IoT



Synchronization mechanism between a device and/or a companion app



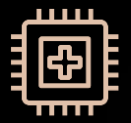
Ability to update, read, or delete the shadow document



Classic shadow and named shadow

© 2022, Amazon Web Services, Inc. or its affiliates. All rights reserved.

AWS IoT Device Shadow workflow



AWS IoT thing device

1 – **Device** publishes current state



```
{ "state":
      { "desired":
            { "heart_rate": "ON" }
      }
}
```



AWS IoT Device Shadow

3 – **App** request device status



4 – **App** request status changes



```
{ "heart_rate" : "ON" }
```



Application

5 – **Device Shadow** syncs updated state





AWS IoT Device SDK

6 – **Device** publishes current state



7 – **Device Shadow** confirms state changes



```
{
  "heart_rate" : "60", "ON"
  "blood_pressure" : "80/120", "ON"
"ON"steps_walked" : "1000", "ON"
} "steps_walked" : "1000", "ON"
}
```

2 – Persist to datastore



Persistent datastore

```
{ "state":
      { "reported":
            { "heart_rate": "OFF"}}
      }
}
```

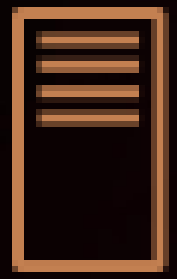
aws

© 2022, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Limitations of classic shadows



Cost optimization



Shadow size is limited to 8 KB by default



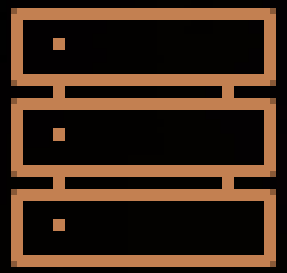
Lack of fine-grained access control

aws

© 2022, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Named shadow

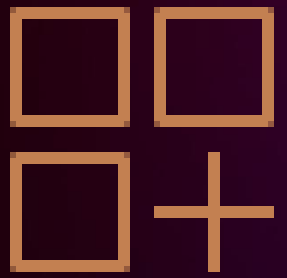
Enable customers to create multiple shadows for a single IoT device; customers can store a large number of data/attributes and keep the cost low



Multiple named shadows to store large amount of data



Cost-effective



Fleet indexing and rules engine integration

aws

© 2022, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Named shadow design approaches

1. **Usage-based:** It allows you to logically group device attributes based on their update frequency

2. **Function-based:** It allows you to create named shadows based on the different desired functionalities

3. **Access control-based:** It allows you to create data view for end users based on the desired access control pattern

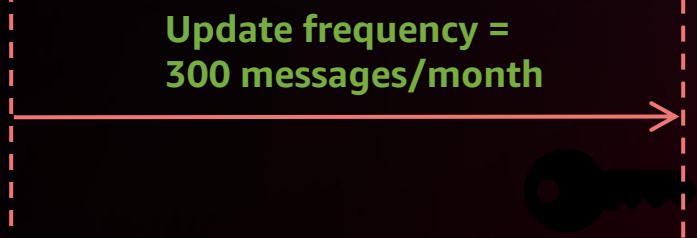
aws

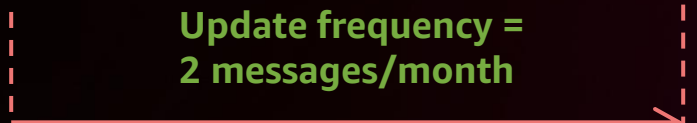
© 2022, Amazon Web Services, Inc. or its affiliates. All rights reserved.

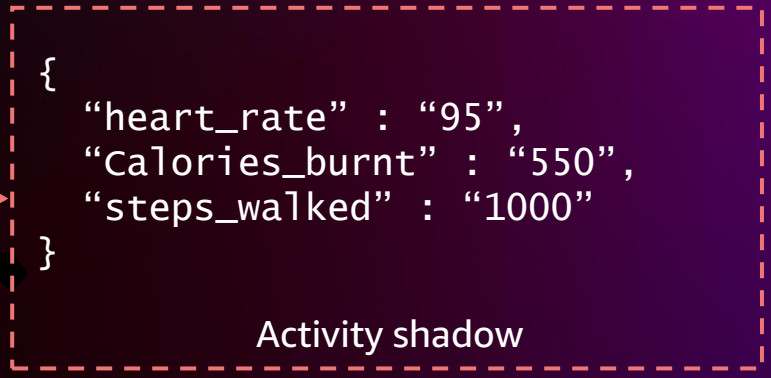
Usage-based design

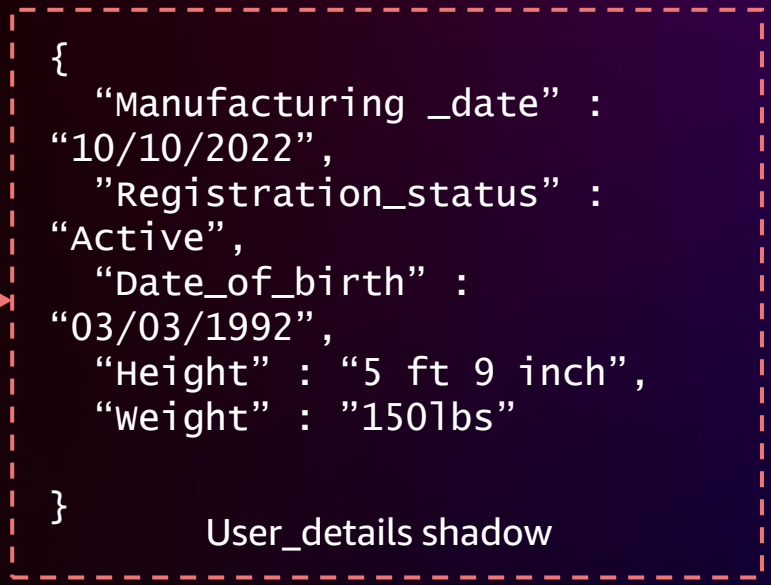








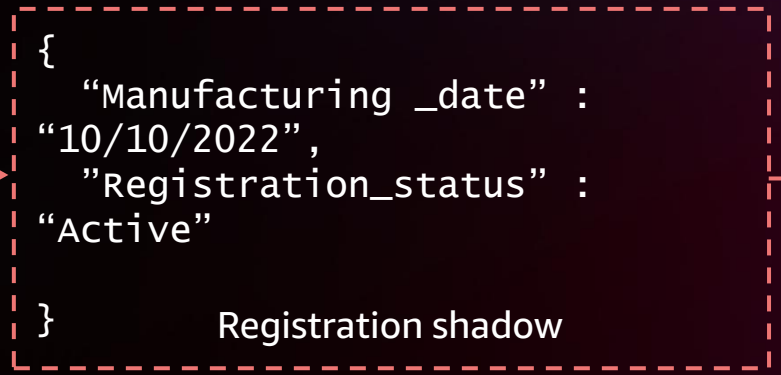


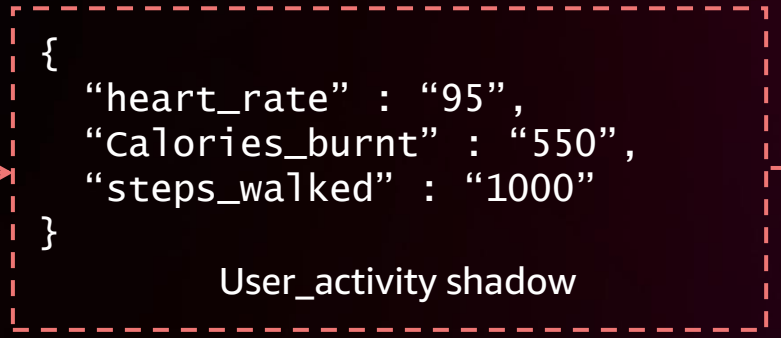


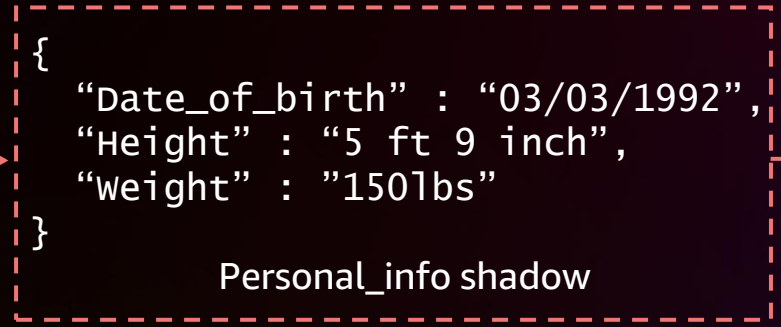
aws
© 2022, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Function-based design










IoT rule 1



Email notification


IoT rule 2


Amazon API Gateway


IoT rule 3

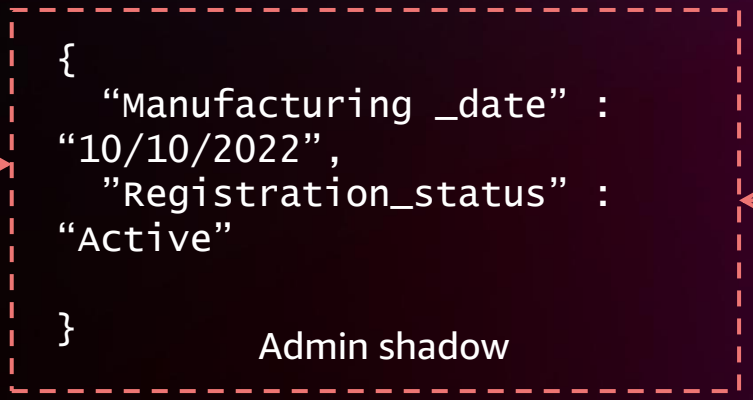

Amazon DynamoDB

aws
© 2022, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Access control-based design











Application developers



Mobile client

aws
© 2022, Amazon Web Services, Inc. or its affiliates. All rights reserved.

AWS IoT Device Shadow use case

CHALLENGE

Establish fast and asynchronous communications between iRobot's Roomba devices and Home App



SOLUTION

AWS IoT Device Shadow enables iRobot to establish asynchronous communication where the Roomba users update cleaning schedule/status on the Home App, and the Roomba receives updates schedule/status through device shadow whenever it comes back online

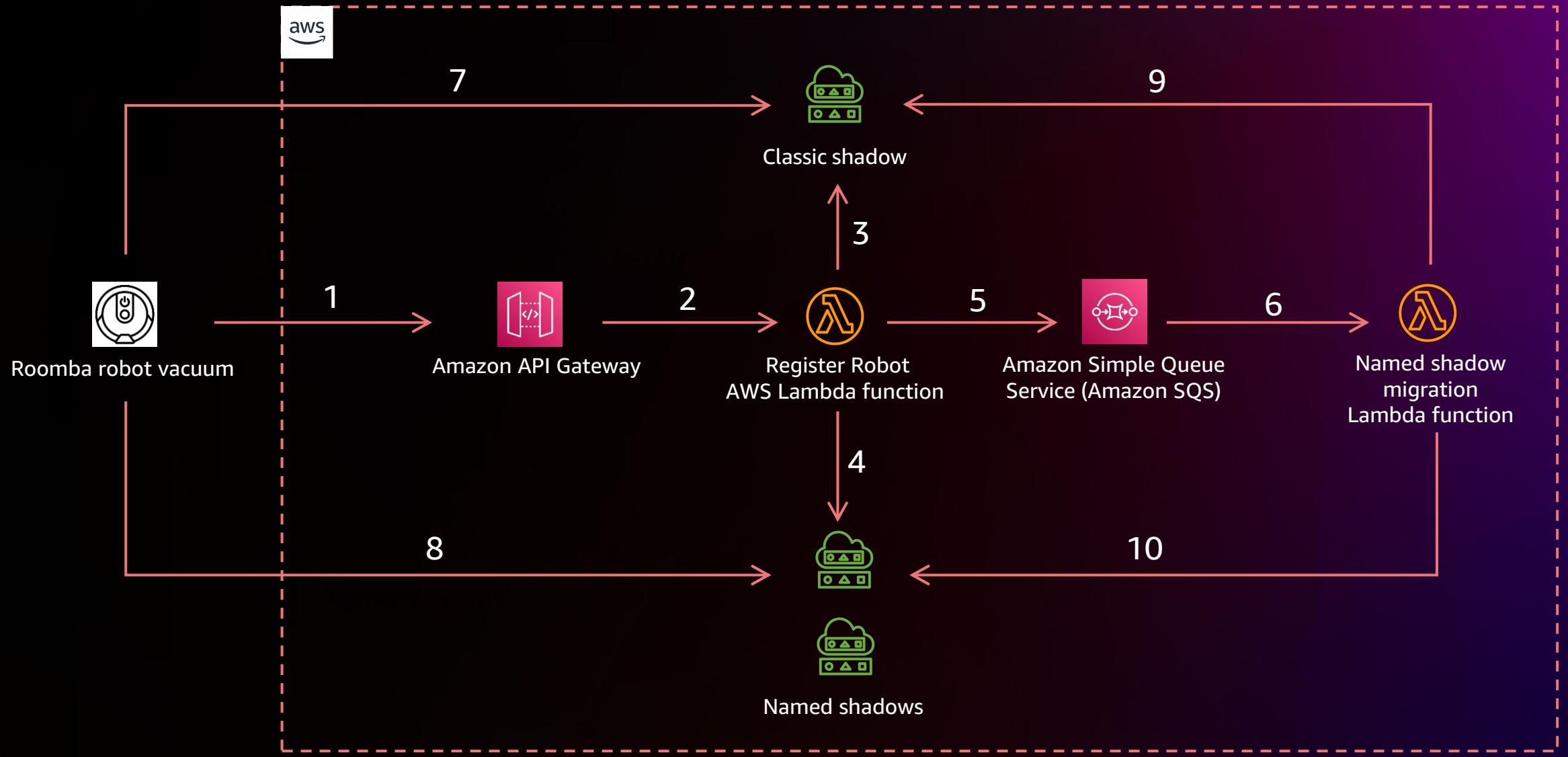
IMPACT

By using a combination of both classic and named shadows, iRobot is able to keep the cost of the implementation low and is able to deliver current device state and settings to 10+ million Roomba users

aws

© 2022, Amazon Web Services, Inc. or its affiliates. All rights reserved.

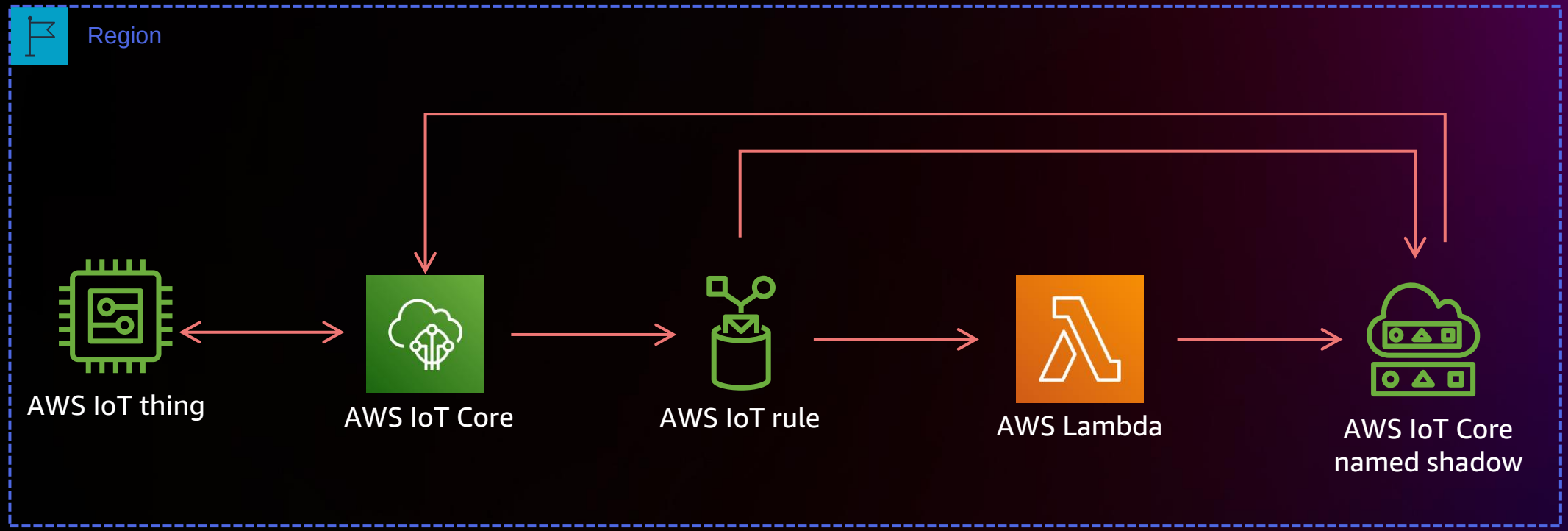
iRobot’s classic shadow to named shadow migration



© 2022, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Innovation that AWS Partners are driving

Advanced IoT Partner with deep expertise in design, architecture, cloud solutions, enterprise managed services, and more; OST helps companies discover insights, align stakeholders, and gain a competitive advantage



Architecture diagram: IoT platform designed on AWS for the customer Intermatic

© 2022, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Thank you!

Rajat Mathur
matrajat@amazon.com

Andrew Chen
cyongdon@amazon.com



Please complete the session survey in the **mobile app**

© 2022, Amazon Web Services, Inc. or its affiliates. All rights reserved.