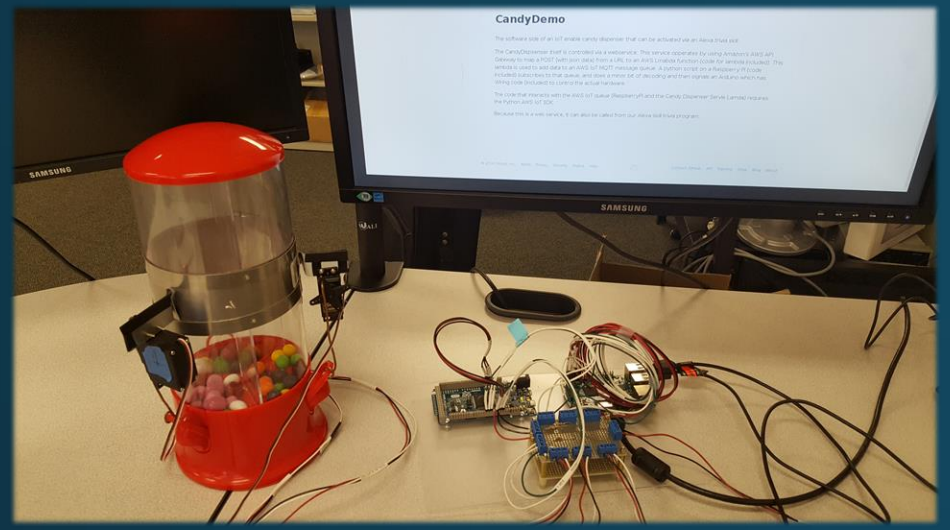
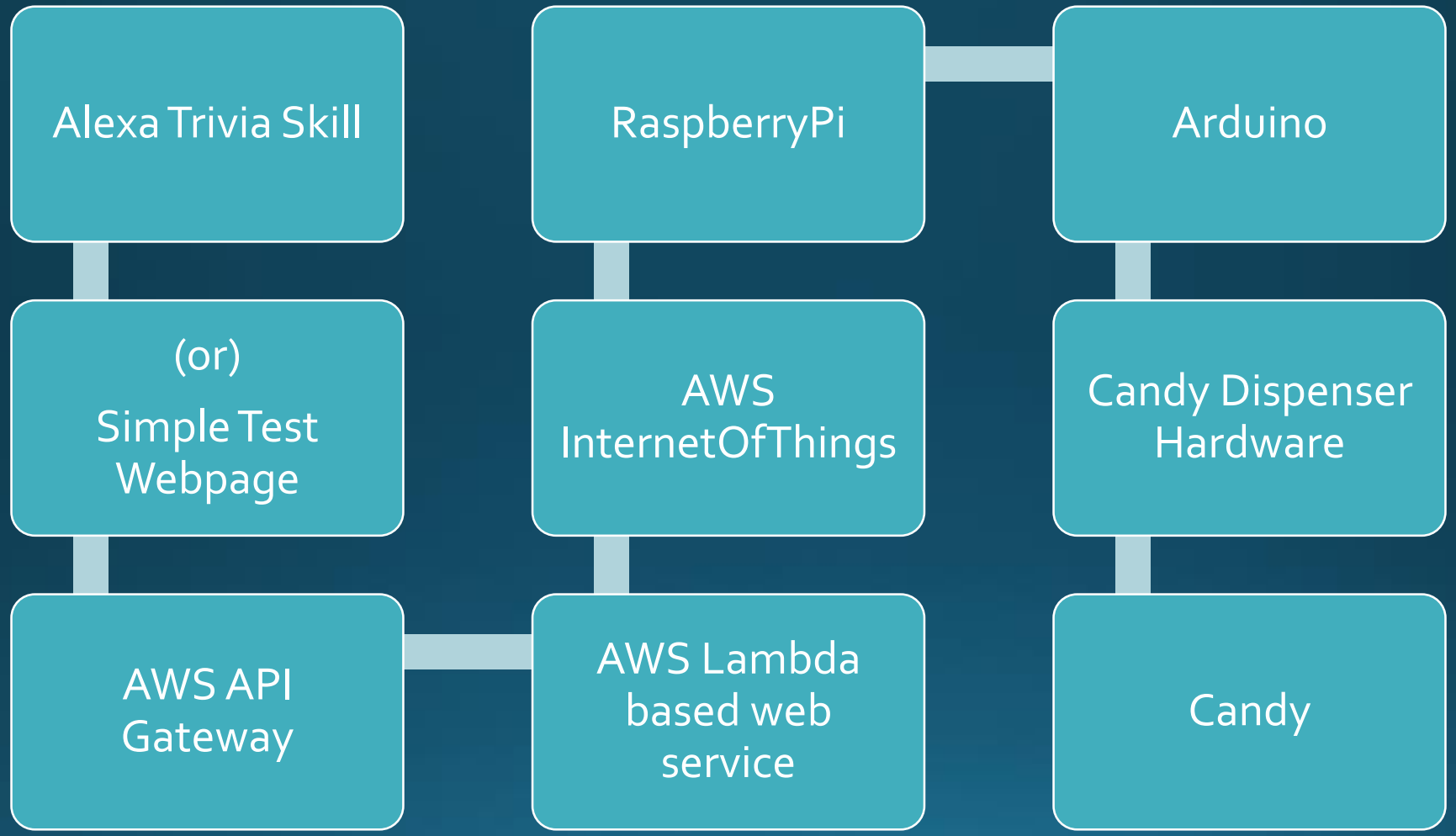


CandyTron

An Alexa/AWS/RaspberryPi/Arduino Technology Demo, - with Candy.

Ryan Powers, Tim Massaro


Alexa Trivia Skill
RaspberryPi
Arduino
(or)
Simple Test Webpage
AWS InternetOfThings
Candy Dispenser Hardware
AWS API Gateway
AWS Lambda based web service
Candy

Trivia Alexa Skill

- "Skill" – any voice-driven application for the Amazon Echo/Dot/Show or Tap. Check the weather, stream music, turn on lights, order pizza…
- Amazon supplies demos to get Skill writers started, including Build-a-Trivia-Skill-in-under-an-Hour <= I started here.
- Modified the skill to become Minnesota Fun Facts Trivia and published it. If you have an Alexa, try it out!
- For CandyTron, I modified it again, added an http call to the AWS API (not this is only on my personal Amazon account). The invocation phrase is: "Candy Demo"

Simple Test Webpage

- Very simple webpage allowing us to call the web service easily without the need to run an Alexa Skill.
- Hosted on AWS Simple Storage Service (S3) and served up as a static page
- http://candydemo.s3-website-us-west-2.amazonaws.com/

AWS API Gateway

- Maps an incoming request to the appropriate resource
- In this case the request is a POST to https://qqv7kisnze.execute-api.us-west-2.amazonaws.com/test/openCandy with a JSON body
- Body of the request {"candyType": “bin2" }
- This gets mapped to the openCandy AWS Lambda function

AWS Lambda -- OpenCandy

- OpenCandy is written in Python
- Accepts the JSON input sent as the body of the POST request
- Strips out the CandyType data, and adds that to the AWS IoT MQTT queue
- Source available in repository. It is largely based on the sending half of a python demo program provided as part of the AWS IoT SDK (https://github.com/SaturnGrandRapids/CandyDemo)
- A range of monitoring options are available

AWS Internet of Things

- We used the MQTT Queue, an AWS “IoT thing” (device) shadow would also be an option
- This queue is what connects the AWS Lambda service with the Raspberry Pi hardware.
- SDKs are available for a range of platforms

Raspberry PI

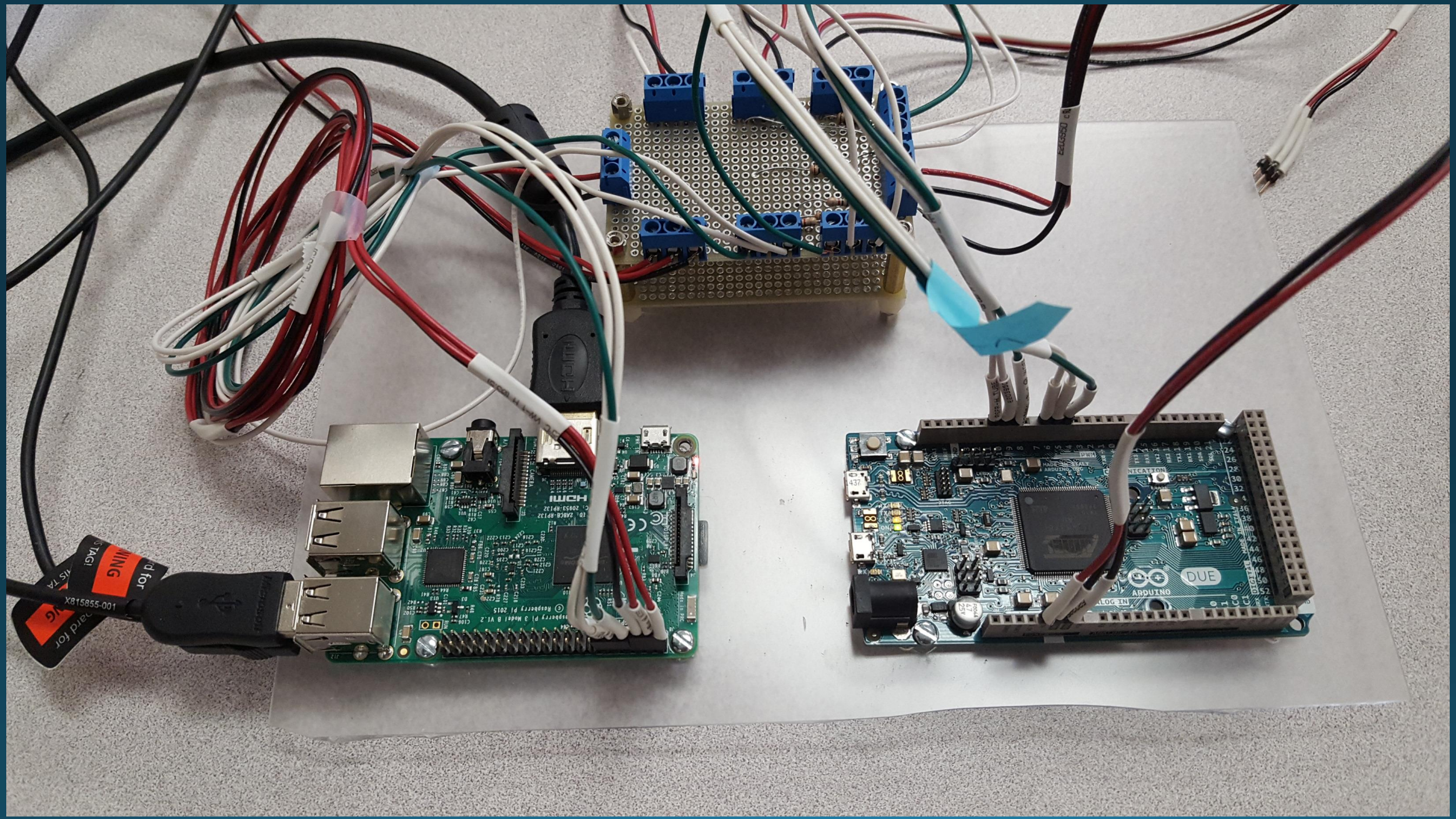
- Used this in addition to the Arduino because of the built in networking capabilities
- Python code using the AWS IoT SDK
- Subscribes to the AWS IoT MQTT queue, and listens for message
- Turns on one of three GPIO pins depending on which bin candy is to be dispensed from

Arduino

- Controls the actual servos. Servo control from a Raspberry Pi is problematic without additional hardware
- Sends servo PWM control signals to one of three output pins based on the state of three input pins
- Used Arduino IDE so written in Wiring (essentially simplified C++ with a collection of libraries useful for hardware tinkering)

Candy Dispenser Hardware

- Cheap eBay candy dispenser
- 3 servos
- Each servo goes from one extreme to the other, with a pause in the middle when it is signaled to dispense candy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