

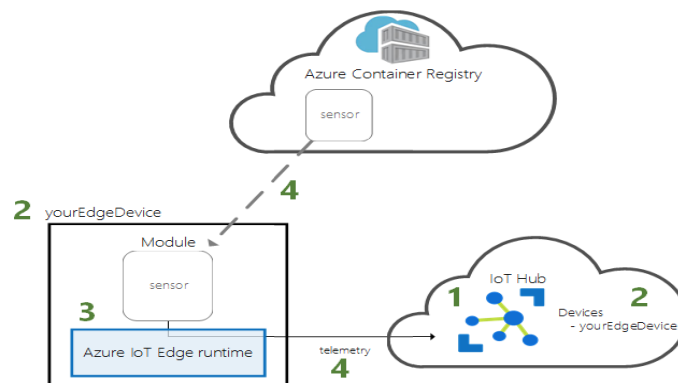
# Edge Computing Platforms Progress Report

November 18<sup>th</sup>, 2019

## 1 Progress Report

Until now the majority of the design as well as certain sections of the implementation of the project have been completed. Accounts have been set-up for Microsoft Azure, specifically Azure IoT Edge, and AWS. Test runs have been simulated for both AWS Greengrass and Azure IoT edge to ensure both applications are operating accordingly.

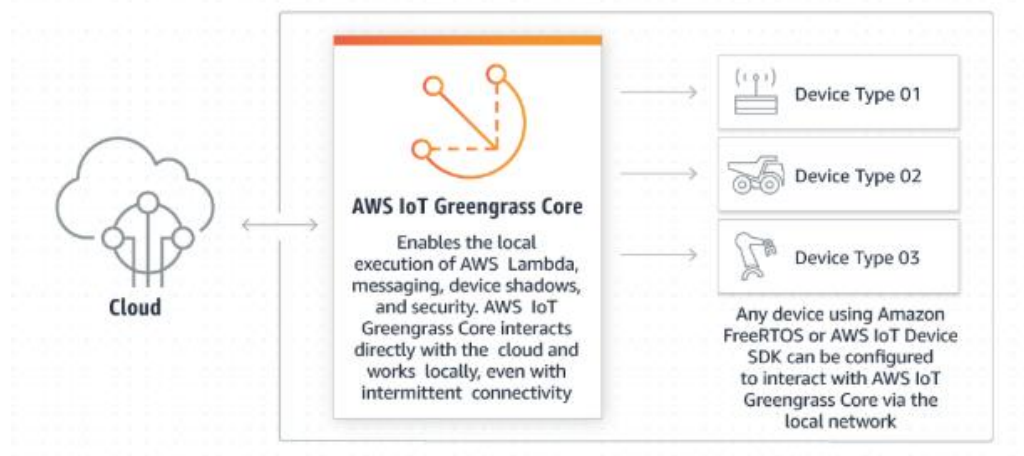
Currently the Azure IoT Edge Module was deployed for a test run through a Windows network. Here a sample containerized code was taken to a mobile device (OnePlus 3) which acted as the sample virtual IoT edge device as the workloads were sent to the edge. First an IoT hub was created, and the device was registered, afterwards the IoT Edge runtime was installed on the device. A module was then deployed to the IoT Edge device and data was sent to the IoT hub.



The following figure was taken from the Azure IoT Edge documentation page. The link to the page is:

<https://docs.microsoft.com/en-us/azure/iot-edge/quickstart>

For AWS Greengrass, the process initially began with creating a resource group followed by a recommended section that was meant for beginners and automated a number of tasks making it easy to use for a first time user. Afterwards I was asked to download specific keys and create a Docker container to run AWS Greengrass. Since the AWS Greengrass documentation page recommended a Raspberry Pi as the device to use for a first time user, the process came to a halt after the creation of the resource group.



The following figure was taken from the AWS IoT Greengrass documentation page. The link to the documentation is: <https://aws.amazon.com/greengrass/>

## 2 Sections in Progress

After running all of the test cases to ensure the platforms are functioning correctly, the main cases will be run for both cloud platforms. Here multiple mobile devices will run to observe specific data could be stored and extracted on either platforms as well as analyze the platform for features such as efficiency, ease of use, and other metrics that could be noted. On the Azure platform there will be metrics taken to measure areas such as latency and offline capabilities. On the AWS platform, the AWS IoT Device Tester will be used to determine whether or not the devices will run and operate with the services. AWS Greengrass will look to run on a Raspberry Pi, and a mobile device for repetition and to compare results. Also, it should be noted that the Lambda edge section of AWS has yet to be tested as the AWS Greengrass resource group and this is required to run code on the edge more efficiently.

## References

- [1] Eswara. V., Srivastava. G., & Biswas. S. (2017. June). RIOTNet: Reactive IoT Control Network. In *2017 IEEE International Conference on Internet of Things (iThings) and IEEE Green Computing and Communications (GreenCom) and IEEE Cyber. Physical and Social Computing (CPSCom) and IEEE Smart Data (SmartData)* (pp. 643-650). IEEE.
- [2] Kurniawan. A. (2018). *Learning AWS IoT: Effectively manage connected devices on the AWS cloud using services such as AWS Greengrass. AWS button, predictive analytics and machine learning*. Packt Publishing Ltd.
- [3] Noghabi, S. A., Kolb, J., Bodik, P., & Cuervo, E. (2018). Steel: Simplified development and deployment of edge-cloud applications. In *10th {USENIX} Workshop on Hot Topics in Cloud Computing (HotCloud 18)*.