Lab 3: AWS IoT Greengrass

Handout: 17 March, Hand-in: 31 March (Thursday)

In this lab, your group will work together to try out some basic features of AWS IoT Greengrass.

Total marks for this lab: 30pt (+ 10 bonus points)

- Task 1 (15pt): Setup an AWS IoT Greengrass **core device** --- preferably on Raspberry Pi, but a laptop or an EC2 instance (e.g., a t4g.nano instance) is also acceptable. **Demonstrate** the deployment of a custom component from the AWS Cloud to your Greengrass core device. Your custom component should periodically (every 10 seconds) publish an MQTT message that contains your group ID and the current timestamp on the core device to your AWS IoT core.

References:
https://docs.aws.amazon.com/greengrass/v2/developerguide/getting-started.html
https://docs.aws.amazon.com/greengrass/v2/developerguide/ipc-iot-core-mqtt.html

- Task 2 (15pt): Setup an AWS IoT Greengrass **client device** using a Raspberry Pi, which can connect to and communicate with the Greengrass core device you setup in Task 1. **Demonstrate** that (1) your client device can publish periodic MQTT messages (every 2 seconds) to your core device, where the messages should report a random integer between 1 to 7 (both included). (2) for every five messages received from the client device, the core device will send out an MQTT message that contains the average value from those five messages to the AWS IoT Core cloud service.

Reference:
https://docs.aws.amazon.com/greengrass/v2/developerguide/interact-with-local-iot-devices.html

- Challenge yourself (optional, bonus 10pt): change the "object recognition system using the ESP32-CAM" demo in lab 1 so that the ESP32-CAM uses your Greengrass core device to conduct the object recognition, instead of using the AWS cloud service.

References:

https://docs.aws.amazon.com/greengrass/v2/developerguide/perform-machine-learning-inference.html
https://docs.aws.amazon.com/greengrass/v2/developerguide/ml-tutorial-image-classification.html

What to hand-in?

Demonstrate to Prof. Binbin your working systems **by 31 March (Thur)**. You can checkoff earlier when your group completes the tasks. For early checkoff, remember to make an appointment in advance (via email or MS Teams) with Prof. Binbin, since the lectures in the following two weeks will be conducted by Prof. Wenchao.