System design

System macro view

Arrowhead (AH) local cloud (*desktop linux*) with following 4 built in roles (services)

1. Authentication
2. Orchestrator (e.g. authorisation)
3. Service registry
4. IoT Edge Gateway providing interface for
    - Service provider: python **AH-client 0** (*Raspberry pi*)
    - MQTT stream publisher to MQTT-broker (*Mosquitto* on *Raspberry pi*):
        - python **AH-client 1** as subscriber for the IoT that will be streamed to Mosquitto
        - python **mqtt-client 1** publishing stream to mqtt-broker,
    - Service consumer, (*FiPy esp32 dev board*)
        - python **AH-client 2** for authorisation/authentication
        - python **mqtt-client 2** as mqtt-consumer

Preconfiguration

1. Set up AH local cloud
    - Manually register all 3 AH-clients' certificates
    - Manually set up/configure authorisation levels and services for each clients
    - Configure default streaming parameters (attributes)
2. Manually setup mqtt-broker (Mosquitto)
    - register **mqtt-client 1** as stream provider inclusive generated certificate 1
    - register **mqtt-client 2** as mqtt-consumer inclusive generated certificate 2

Activities

In parallell

- Service consumer (**AH-client 2**) through AH-gateway asks for authentication and authorisation
    - after authorisation it authenticates to mqtt-broker
      and starts listening for data on the provided channel (topic)
- Service provider (**AH-client 0**) through AH-gateway starts authentication and authorisation
    i. after authorisation (it could change default streaming parameters as an option)
       it starts providing data to subscribers: **AH-client 2** (AH-gateway will provide it to subscribers)
    ii. Service consumer/subscriber (**AH-client 2**) is going to pull (GET) that data and
    iii. … as **mqtt-client 2** = mqtt-provider push (publish) data for **AH-client 1** through mqtt-broker
    iv. Mosquitto is going to publish this data as topic for its consumers (**mqtt-client 2**)
    v. **mqtt-client 2** as mqtt-consumer is going to pull published data from mqtt-broker

TO DO

1. Install and configure all the necessary applications: AH-local cloud and Mosquitto
2. Generate and install necessary certificates
3. Set up accounts/authentication, roles and authorisation on AH-local cloud and Mosquitto
4. Write the following python scripts:
    - **AH-clients**: 0, 1 and 2
    - **mqtt-clients**: 1 and 2
5. Test