

Software Engineering of Internet of Things

Handin 1: Performance Evaluation

Aslak Johansen <asjo@mmmi.sdu.dk>

Mar 22, 2021

Task

Summary: Replicate the setup of figure 1, evaluate the end-to-end performance and determine how the different components contribute to it.

Details:

1. **Establish the setup from figure 1:** The figure includes 5 components, namely a *signal generator*, a *moving average calculator*, an *absolute humidity calculator*, a *client*, and a publish-subscribe substrate. You can use whichever implementation you like for these components, but they should run on the same physical machine. Options include, but are not limited to:
 - *Publish-subscribe substrate* I suggest using the Mosquitto MQTT broker that we have worked with in a previous exercise.

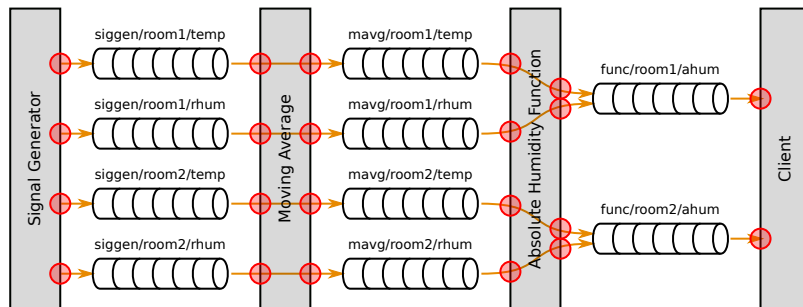


Figure 1: Stream processing setup. Grey boxes represents processing components, the queues in between components represents named topics for brokered communication, and red circles indicate points for measuring time.

- *Client* I suggest using the `mosquitto_sub` command from the `mosquitto` clients package that we have worked with in a previous exercise.
 - *Signal generator* With this exercise you should have received two implementations of this component. One implemented in Go, and another one implemented in Java. You can use either, or create a new one.
 - *Moving average calculator* With this exercise you should have received two implementations of this component. One implemented in Go, and another one implemented in Java. You can use either, or create a new one.
 - *Absolute humidity calculator* With this exercise you should have received two implementations of this component. One implemented in Go, and another one implemented in Java. You can use either, or create a new one.
2. ***Modify the components for logging:*** Modify components to print out relevant info when receiving/sending messages according to the red circles of figure 1.
 3. ***Define and describe experimental setup:*** Describe an experimental setup capable of collecting the data needed evaluating the goal from the summary.
 4. ***Establish and execute experiment:*** Run the relevant components in a test harness for logging resource consumption and timestamping printouts. Either use the test harness we have worked with in a previous exercise¹, modify it or create your own.
 5. ***Present experimental results:*** Determine how to best present the results of experiments. This includes considering the following questions:
 - What are the relevant metrics?
 - For each of these metrics, what is the relevant unit?
 - How can these metrics be extracted from the log files of the experiments?
 - How should these results be summarized; through plots and/or tables?
 6. ***Interpret results:*** Based on the experimental results, what are your conclusions?

Deadline

April 30th, 2021.

¹<https://github.com/aslakjohansen/simple-java-test-harness>