Modelling IoT Application Requirements for Benchmarking IoT Middleware Platforms

Introduction

- The significant advances on the Internet of Things (IoT) technology have led to IoT applications being widely used in various scenarios

IoT Middleware Platforms:

- provide functionalities
- used to ease the application development process

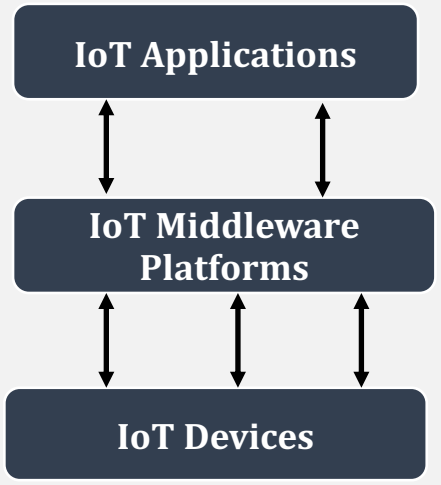

Fig 1: IoT Ecosystem Architecture

- Plethora of existing middleware platforms provide similar functionalities
- A challenge to choose the most suitable platform for implementing IoT applications

Motivating Scenario

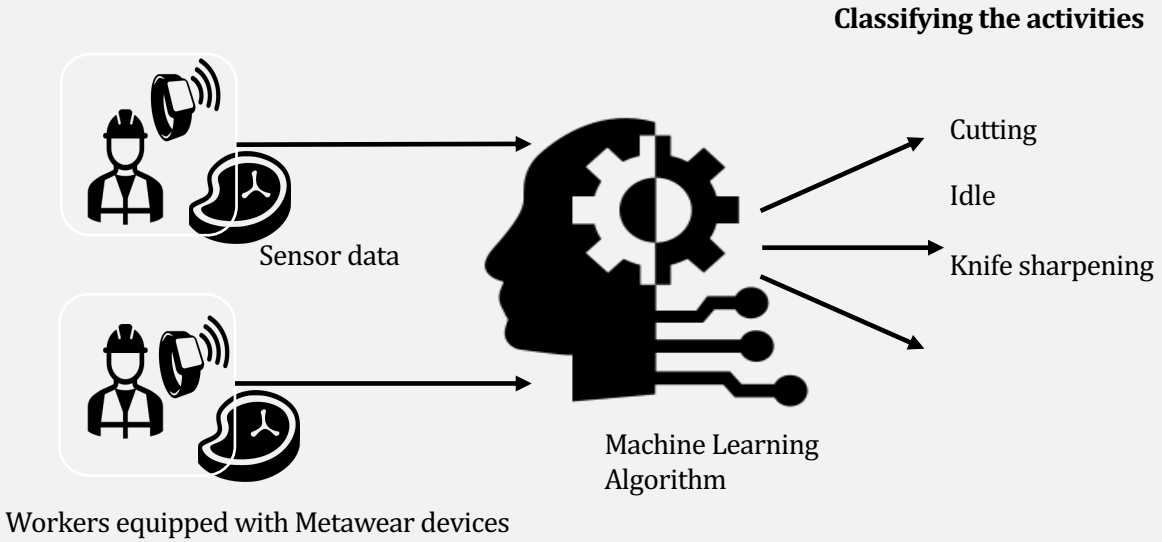

Fig 2: Application to improve productivity of factory workers

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Proposed Framework

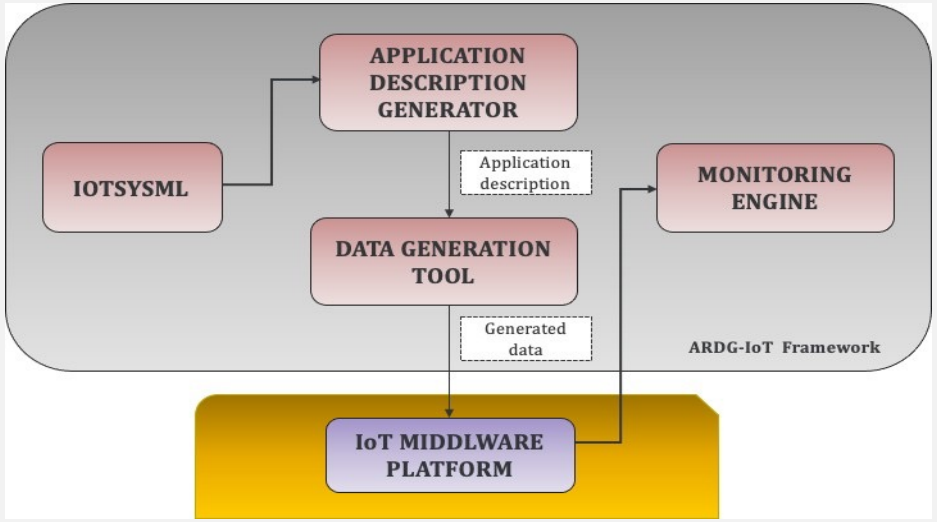

Fig 3: ARDG-IoT Framework

- **IoTSySML** - allows to represent the IoT application requirements for enabling IoT application development.
- **Application Description Generator** – generates input template for the data generation tool
- **Data Generation Tool** – Generates data according to the captured application requirements and the data is sent to IoT middleware platforms
- **Monitoring Engine** – provides real-time information of the data being received on the IoT middleware platforms

IoTSySML – Model to represent IoT Application Requirements

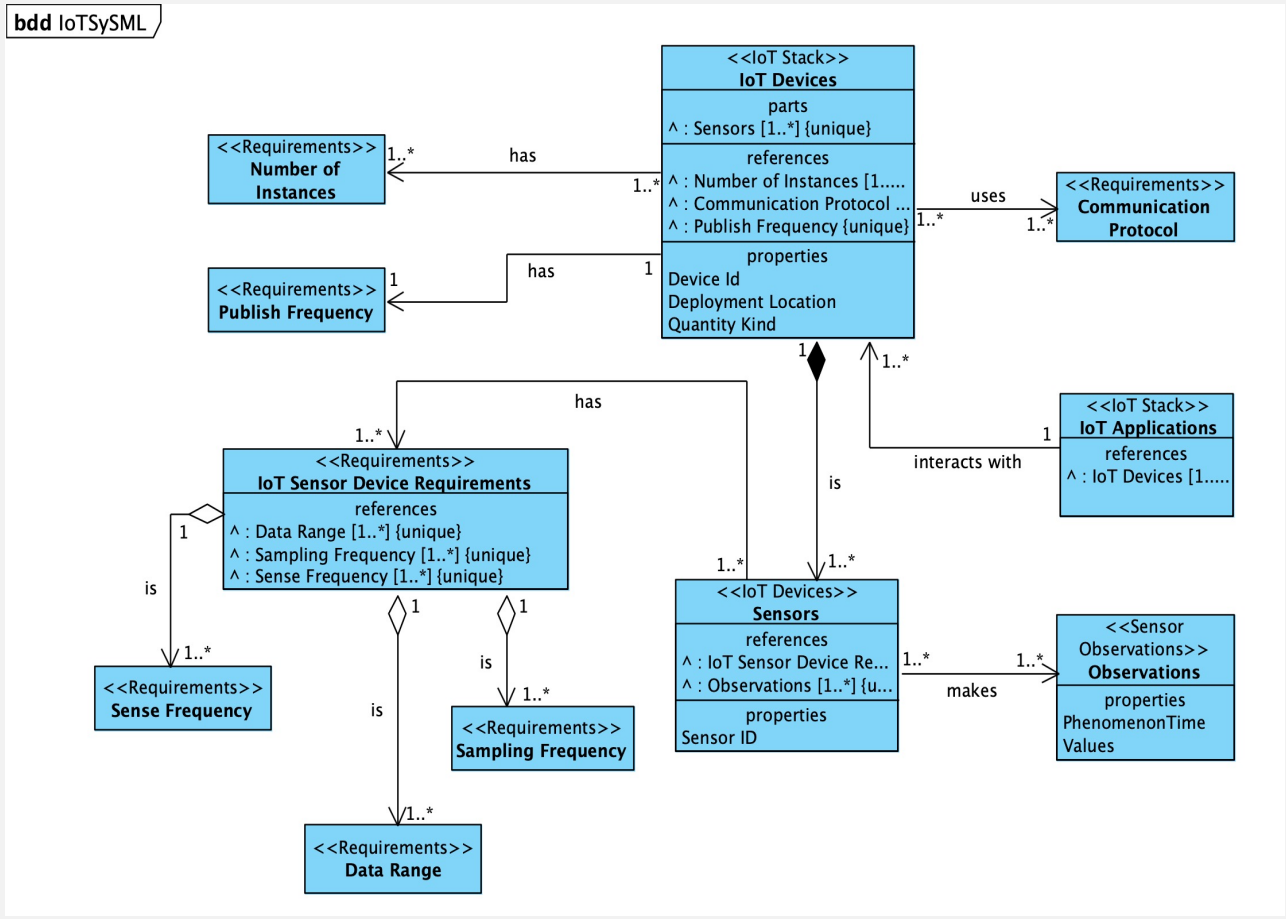

Fig 4: Model to represent the IoT Application Requirements

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Implementation Workflow

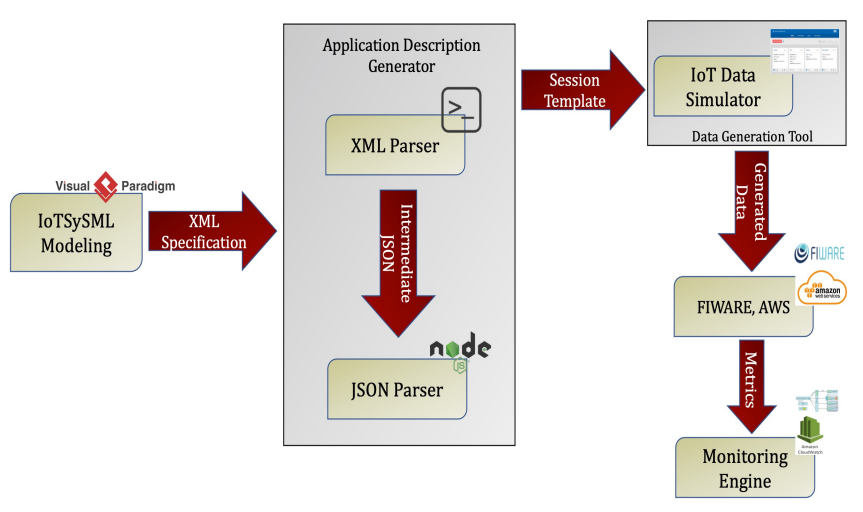

Fig 5: Implementation Workflow

Results

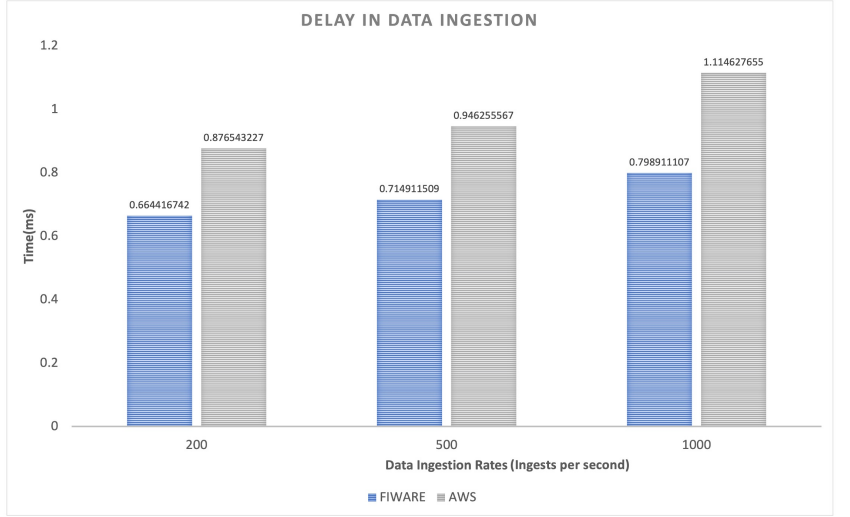

Fig 6: Comparing Data Ingestion Delay

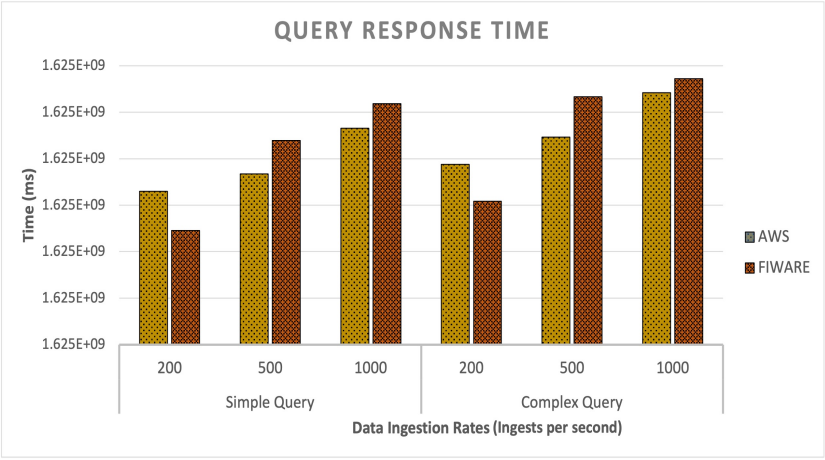

Fig 7: Comparing Query Response Time

Conclusion and Future Work

- Step towards developing an integrated approach for conducting benchmarks
- Easy to use approach to conduct performance benchmarks
- As future work, we plan to extend the framework to include other aspects like generating benchmark queries and evaluate the framework with other application scenarios

References

[1]. Forkan, A.R.M., Montori, F., Georgakopoulos, D., Jayaraman,P.P., Yavari, A. and Morshed, A., 2019, July. An industrial IoT solution for evaluating workers' performance via activity recognition. In *2019 IEEE 39th International Conference on Distributed Computing Systems (ICDCS)* (pp. 1393-1403). IEEE

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