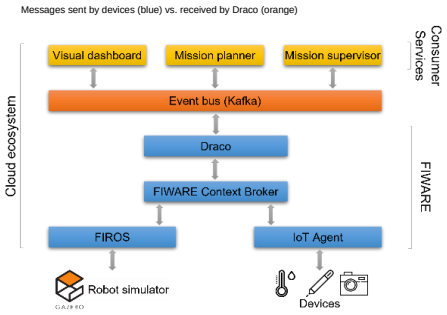
WeLASER
Eco-innovative weeding with laser

Practice Abstract N.16

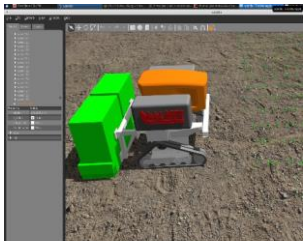
Integration of IoT and robotic data

Opportunities

Cloud computing enables data aggregation from disparate sources and integrates them to environmental, field, and machinery observations. Such integration enables the possibility to monitor and control the effectiveness of weeding tasks with respect to robotic and environmental data. While robotic data describe the status and the performance of the working robot, environmental data (e.g., weather conditions) enables a deeper understanding of the context in which the robot is operating.



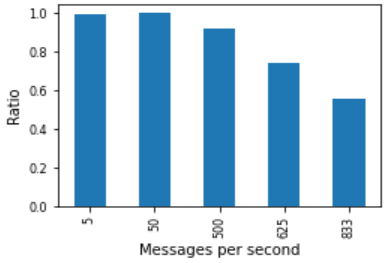
Architecture



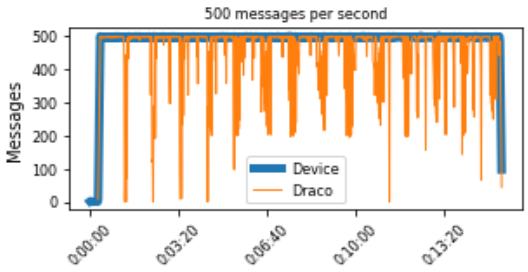
Example of robot simulator

Solution & expected outcomes

Data ingestion techniques and storage systems depend on the IoT device and data features; to this end, it is necessary to design interfaces allowing data to flow from sources to monitoring and analytic services (e.g., mission planner and supervisor). We exploit services from the FIWARE ecosystem, namely the Context Broker (CB; to dispatch data from sources to the end-point services), IoT Agent (to move data between sensors and the CB), FIROS (to move data between robots and the CB), and Draco (to forward data to Kafka). At the first stage, robot simulations are run to test the system's behavior.



Received vs sent messages



Messages sent by devices (blue) vs. received by Draco (orange)

Practical aspects

The experimental evaluation of the system shows that the architecture is capable to handle up to 500 messages per second, more than the estimated amount of data transmitted by the robot and sensors.

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