

«app»
**Sensor Simulator
(Python 3.9)**

sensor_sim.py

1883
«mqtt»
**MQTT Broker
(Mosquitto 2.0)**

«app»
**Fill Controller
(Python 3.9)**

State Machine controller.py

5432
«db»
PostgreSQL 15

filling_db

MQTT Configuration:

- QoS: 1 (at-least-once)
- Max queued: 1000
- Topics: hierarchical

State Machine:

- 6 states, 10 transitions
- 2 clocks (cycle, fill)
- Timeout guards

Database Schema:

- filling_events
- system_metrics
- fault_log
- + 3 views for analysis

publish
sensor/position
sensor/level

subscribe
valve/*

subscribe
sensor/*

INSERT INTO
filling_events
(PostgreSQL)

publish
valve/command
status/update