Village Energy Consumption Counter System

Problem Statement

Design and build the system that allows to receive and collect data about energy consumption from different villages

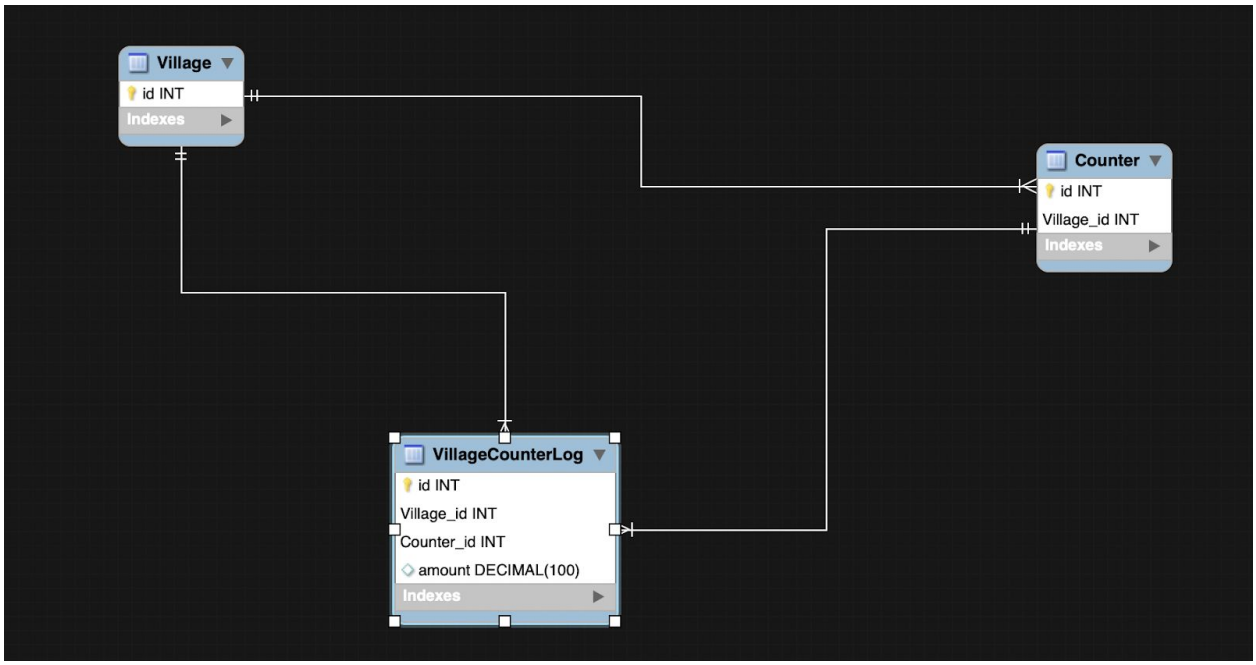
Technology Consideration

The following technologies are used in the design and implementation of the system

- Java
- Spring Boot 2
- Postgresql
- MongoDB
- CLEAN Architecture

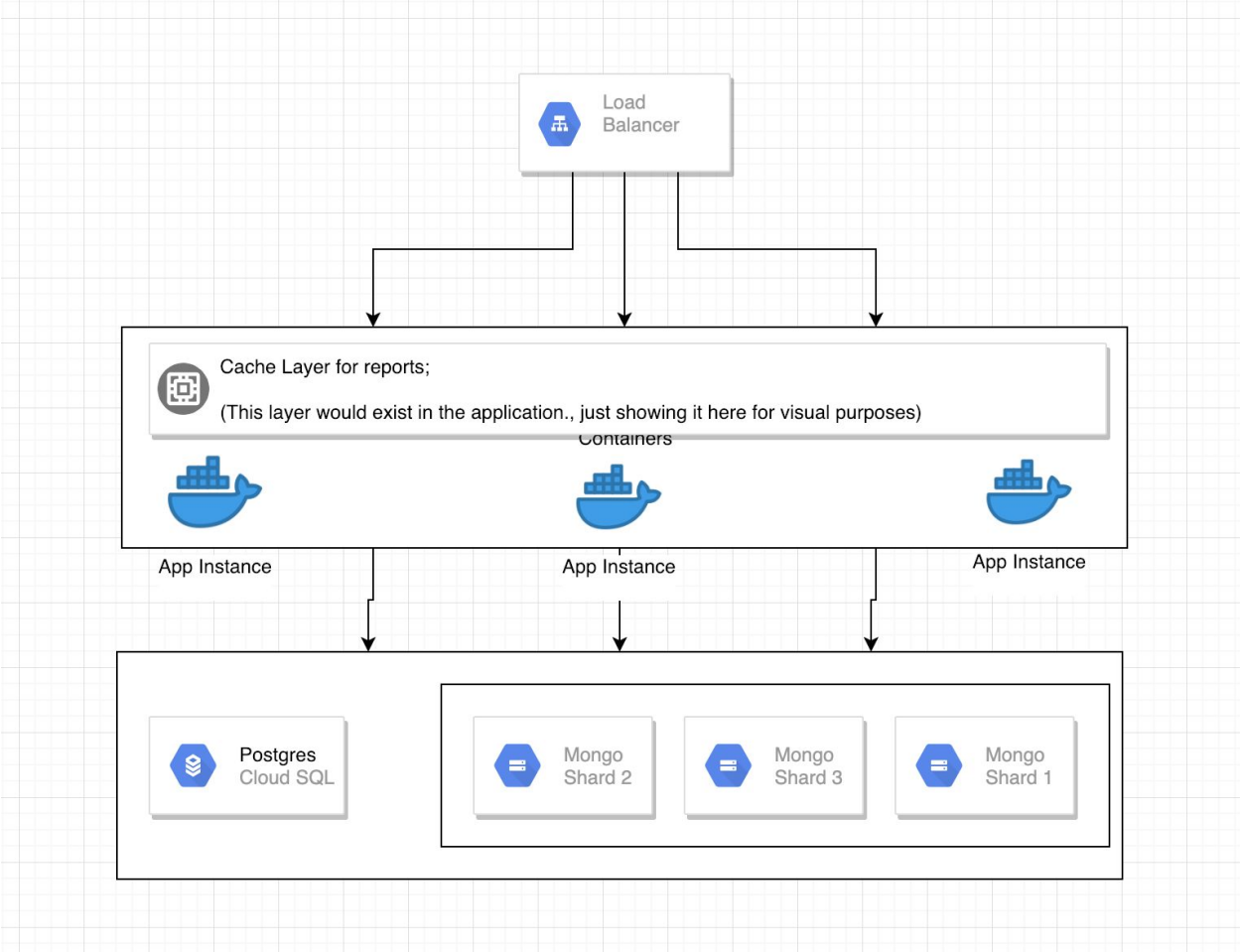
System Core Model Design

The following core entities were identified as core of the system



The Village Counter Log Table was created as a denormalized table to reduce the amount of joins needed to get the Village consumption statistics in real-time.

System Architecture



- The Postgres database holds the transaction records like details of the village and registered counters
- The Mongodb (not in use in the actual implementation); I would consider storing the counter callbacks here if the records grow at a very fast rate to help with aggregating and storing the report data in the exact format its needed
- Docker would be use for the deployment and Kubernetes for managing the docker containers

Testing Strategy

Integration tests are done; Json files consisting or request data and expected responses are created and used for testing.

During testing, the files are read, the corresponding requests are made and the response from the app is matched with the expected response in the json payload. Response attributes matched includes

- Status code
- Payload size
- Payload data

Improvements Consideration

Use a Queuing system to process the counter callbacks and aggregate the data in mongodb to reduce time complexity of getting the reports to O(1)