INTERNET OF THINGS

FINAL PROJECT

Professors: Giorgio Delzanno, Davide Ancona

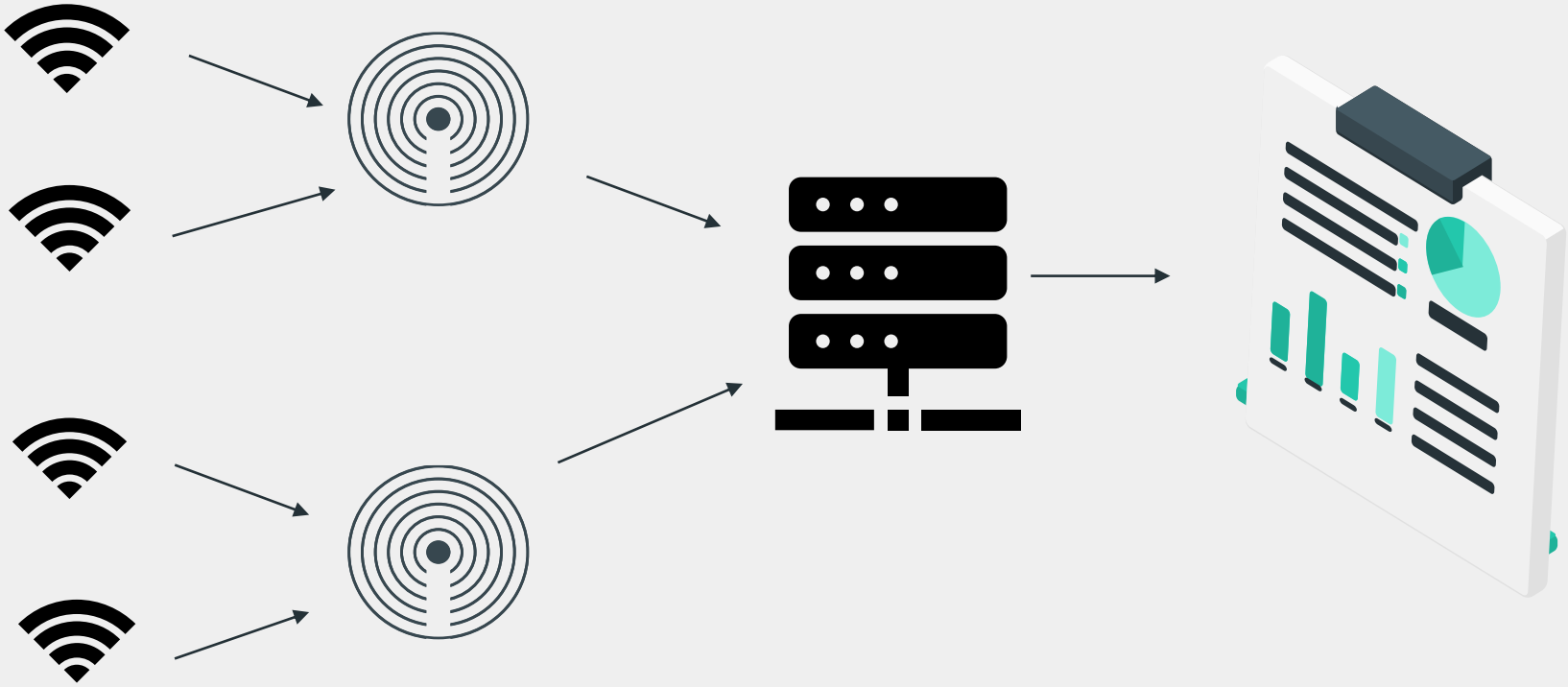
Sahitya Reddy Bollavaram - 4849759

INTRODUCTION

The goal of this project is to estimate the number of people in a building with the help of Beacon Technology. The project consists of four parts which are following

- A beacon simulator which emits beacons.
- Beacon Scanner installed on devices in specific locations in the building which scans nearby beacons from time to time and sends signals to the server.
- A server that collects scanned data and sends alarms to users (is this case – just admins)
- A dashboard that shows live data and statistics of real and historical data.

ARCHITECTURE



BEACON EMITTER

BEACON SCANNERS

SERVER

DASHBOARD

TECH STACK

- Beacon Simulator – Nodejs Bleno Library
- Beacon Scanner - Nodejs Noble Library
- Server– Mosca with MQTT Broker for Live data and HTTP Rest Protocol for Historical Data
- Dashboard – React as MQTT Subscriber

BEACON SIMULATOR

The simulator emits a beacon with UUID (iBeacon Format), however this can be customized with more properties such as name, major, minor versions etc.

BEACON SCANNER

The following information is captured by the scanner.

- Beacon ID
- Beacon Entry Time
- Beacon Exit Time

This data is sent as a signal on a particular topic via the server.

SERVER - MOSCA WITH MQTT BROKER

Functionality:

- Sends signals when a room has reached the threshold.
- Sends an alarm(SMS) to the admin.

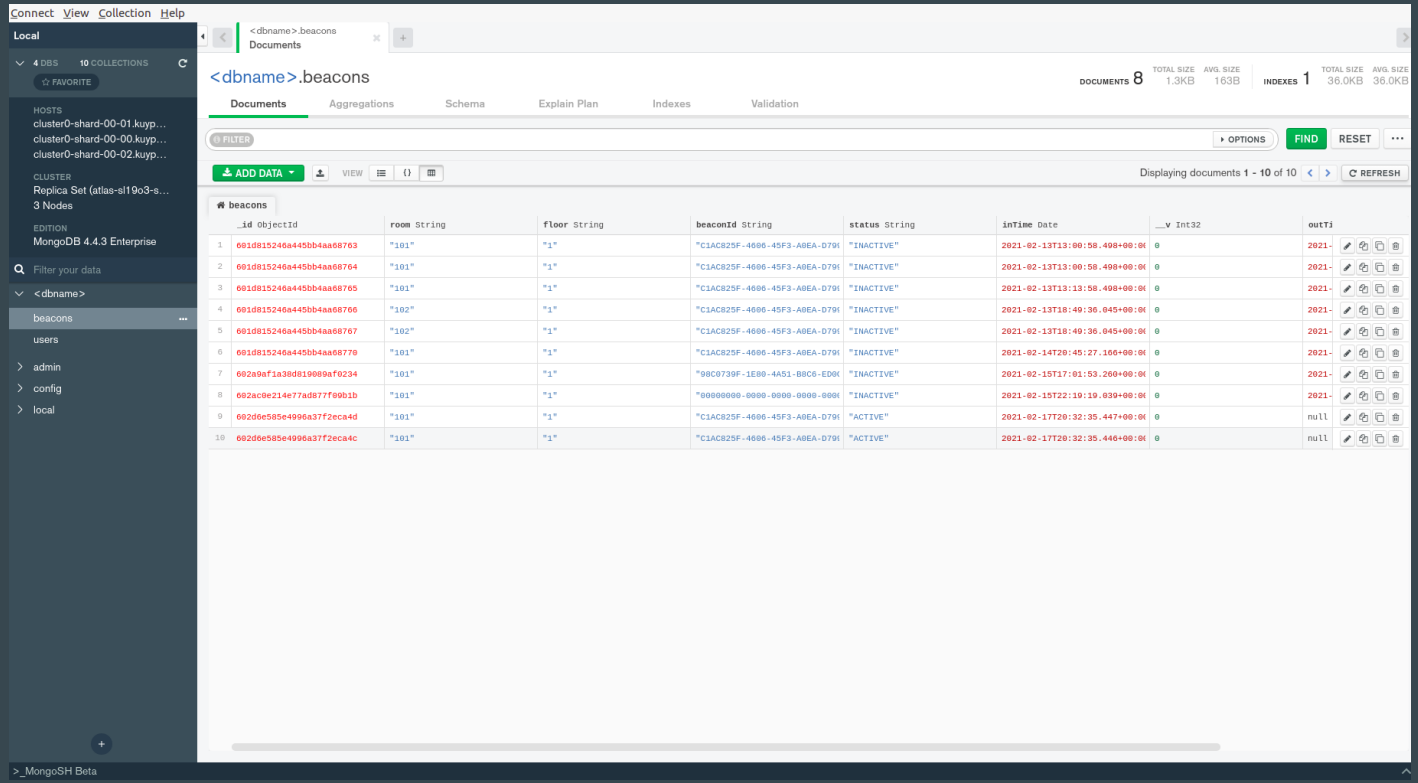
SERVER FOR REST SERVICES

Services for Analytics

- Sends data on request to the dashboard (Rest Service)

1. Active Beacons in each room (/beacon/count)
2. Exited Beacon Duration for today. (/beacon/duration)
3. Beacon Count per every 2 hours (assuming that each lectures lasts for 2 hours) – (/beacon/durationPer2Hours)

DATABASE


Connect View Collection Help
Local
4 DBS 10 COLLECTIONS
FAVORITE
HOSTS
cluster0-shard-00-01.kuyp…
cluster0-shard-00-00.kuyp…
cluster0-shard-00-02.kuyp…
CLUSTER
Replica Set (atlas-sl19o3-s…
3 Nodes
EDITION
MongoDB 4.4.3 Enterprise
Filter your data
<dbname>
beacons
users
admin
config
local
<dbname>.beacons
Documents
<dbname>.beacons
DOCUMENTS 8 TOTAL SIZE 1.3KB AVG. SIZE 163B
INDEXES 1 TOTAL SIZE 36.0KB AVG. SIZE 36.0KB
Documents Aggregations Schema Explain Plan Indexes Validation
FILTER
OPTIONS FIND RESET
ADD DATA VIEW
Displaying documents 1 - 10 of 10 REFRESH
beacons
_id ObjectId
room String
floor String
beaconId String
status String
inTime Date
__v Int32
outTi
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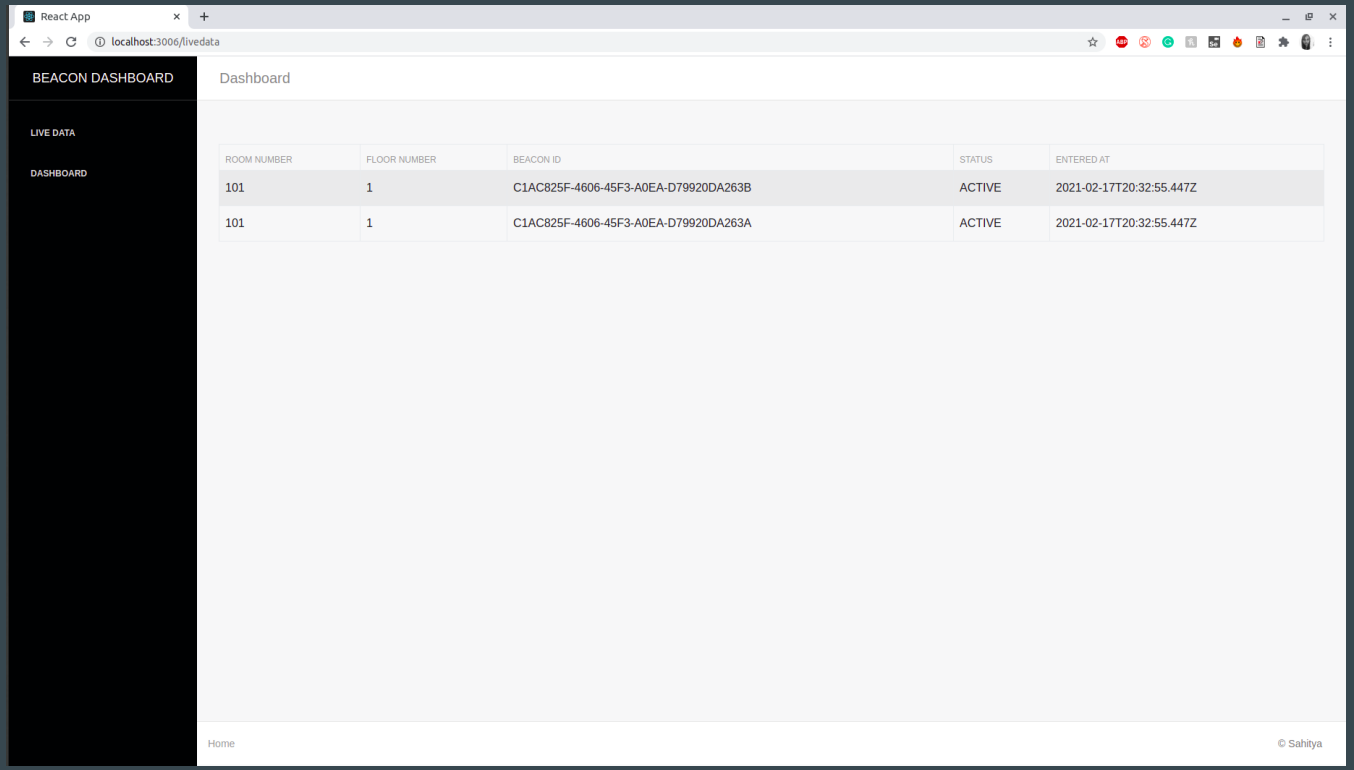
>_MongoSH Beta

CLIENT - DASHBOARD USING REACT

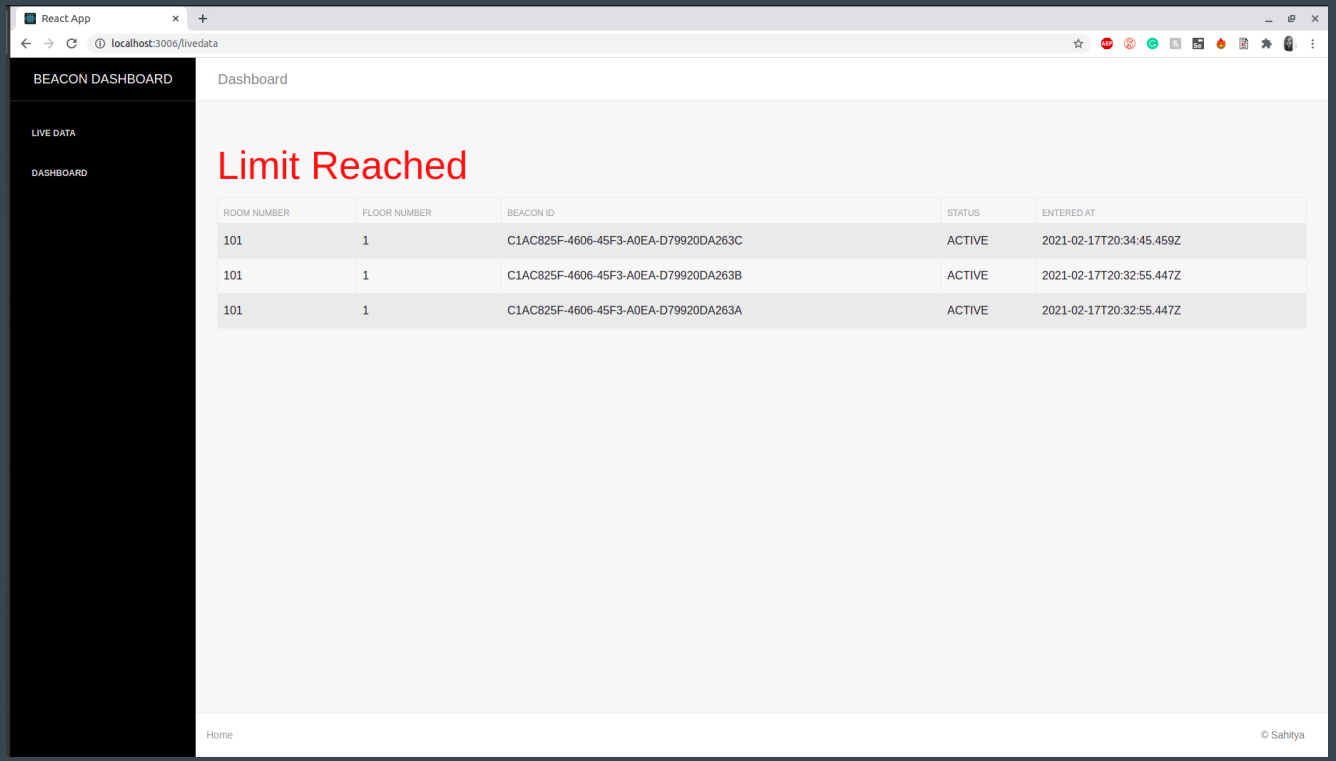
The Dashboard consists of 2 routes.

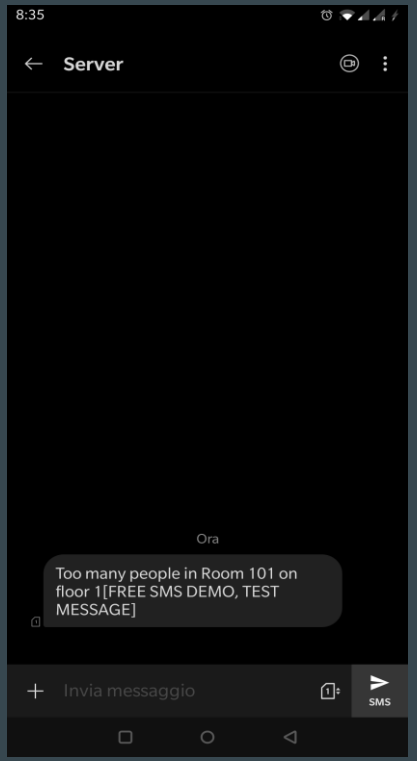
- Live data
- Statistics

CLIENT - LIVE DATA

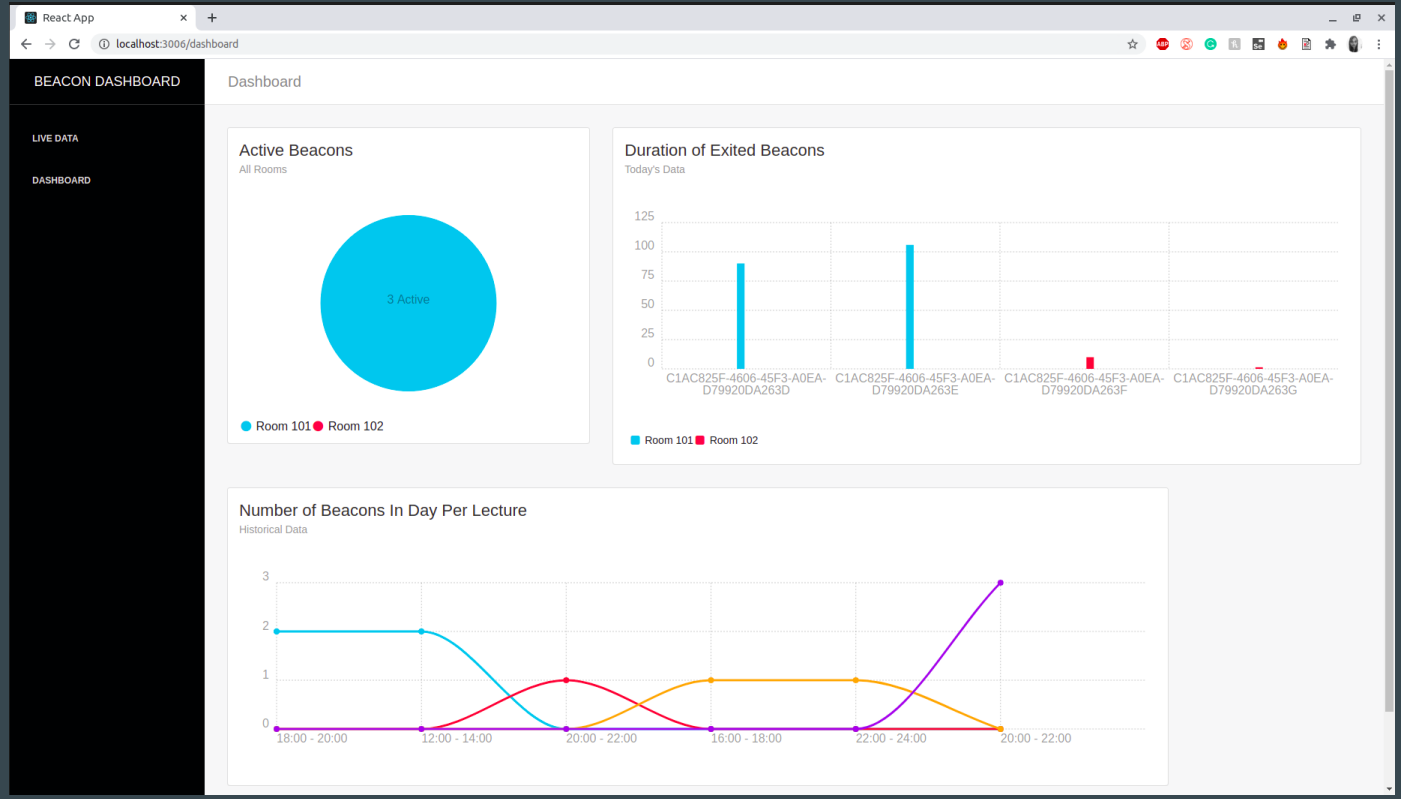


CLIENT -LIVE DATA

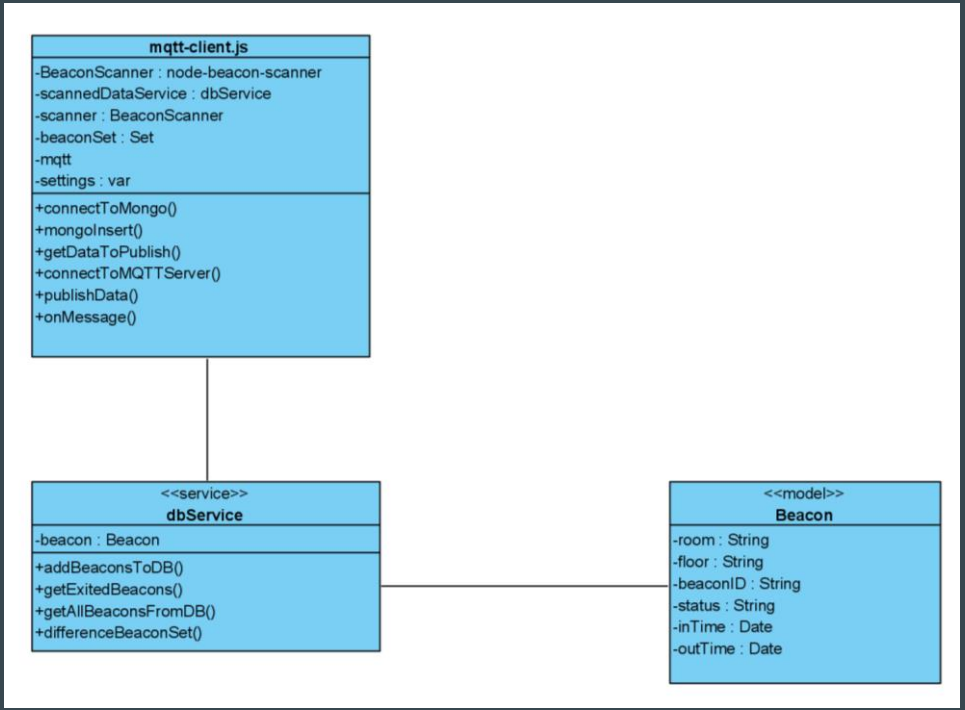




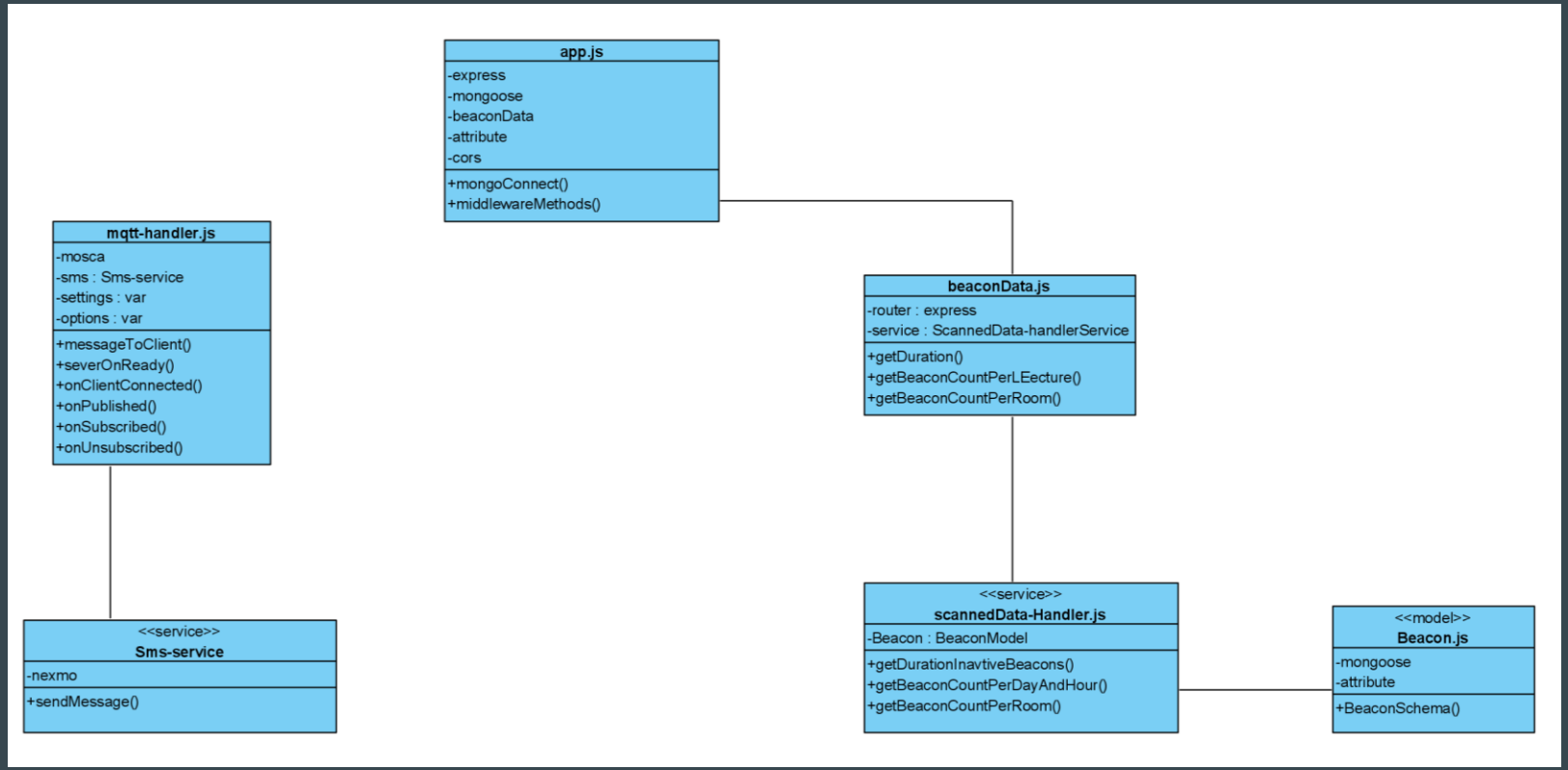
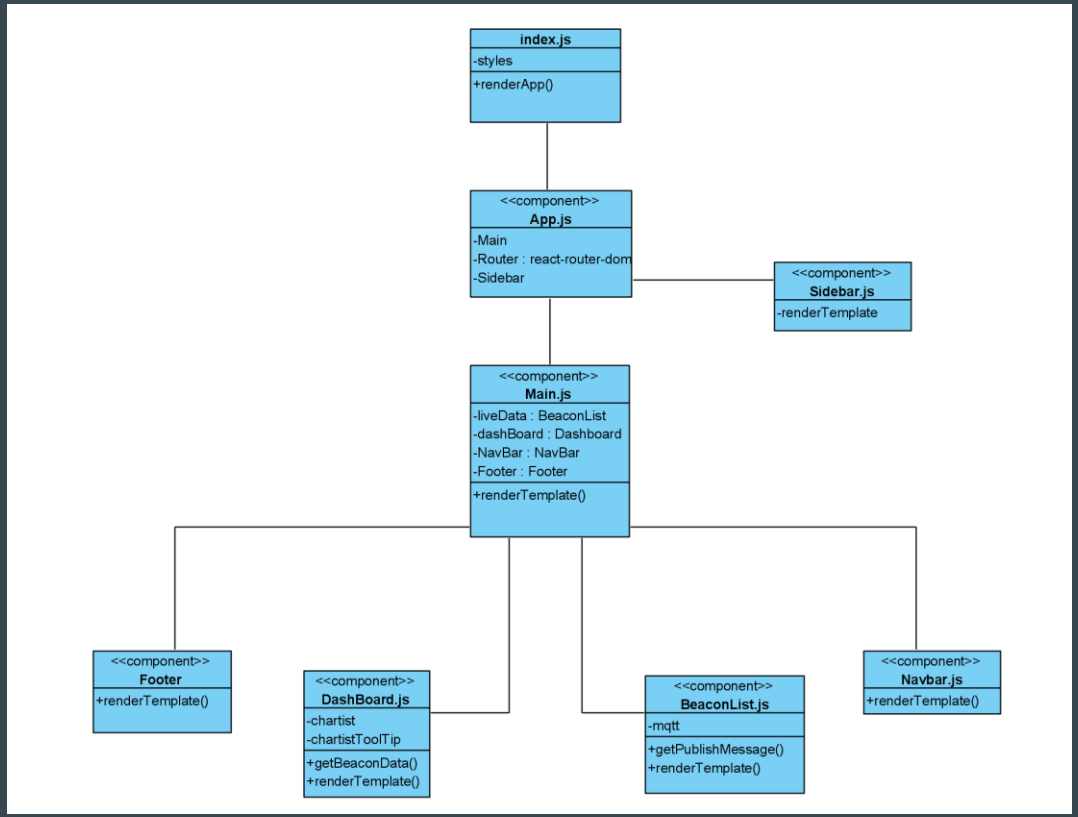
CLIENT - ANALYTICS



CLASS DIAGRAM - SCANNER



CLASS DIAGRAM - SERVER



CLASS DIAGRAM - DASHBOARD