

Projekat 2 – Uputstvo

Senzor service

Senzor service je mikroservis pisan u node.js . Ovaj mikroservis se koristi za citanje podataka iz baze podataka i slanje tih podataka na preko mqtt brokera na odredjeni topic. Za potrebe projekta je koriscen EMQX mqtt broker zajedno sa eKuiperom. Ovaj mikroservis cita podatke i salje ih na topic na svakih 5 sekundi.

Izgled izlaza u konzoli nakon publishovanja podataka na topic iz baze podataka :

```
Connected to MQTT broker
Konektovano na MySQL bazu podataka.
City data: {"Id":1,"City":"Oslo","Country":"Norway","Smart_Mobility":6480,"Smart_Environment":6512,"Smart_Government":7516,"Smart_Economy":4565,"Smart_People":8618,"Smart_Living":9090,"SmartCity_Index":7138,"SmartCity_Index_relative_Edmonton":666}
Published data to topic: sensor_dummy/values
City data: {"Id":2,"City":"Bergen","Country":"Norway","Smart_Mobility":7097,"Smart_Environment":6876,"Smart_Government":7350,"Smart_Economy":4905,"Smart_People":8050,"Smart_Living":9090,"SmartCity_Index":7296,"SmartCity_Index_relative_Edmonton":823}
Published data to topic: sensor_dummy/values
City data: {"Id":3,"City":"Amsterdam","Country":"Netherlands","Smart_Mobility":7540,"Smart_Environment":5558,"Smart_Government":8528,"Smart_Economy":8095,"Smart_People":7098,"Smart_Living":7280,"SmartCity_Index":7311,"SmartCity_Index_relative_Edmonton":839}
Published data to topic: sensor_dummy/values
City data: {"Id":4,"City":"Copenhagen","Country":"Denmark","Smart_Mobility":7490,"Smart_Environment":7920,"Smart_Government":8726,"Smart_Economy":5580,"Smart_People":5780,"Smart_Living":7200,"SmartCity_Index":7171,"SmartCity_Index_relative_Edmonton":698}
Published data to topic: sensor_dummy/values
City data: {"Id":5,"City":"Stockholm","Country":"Sweden","Smart_Mobility":6122,"Smart_Environment":7692,"Smart_Government":8354,"Smart_Economy":4330,"Smart_People":6743,"Smart_Living":7730,"SmartCity_Index":6812,"SmartCity_Index_relative_Edmonton":340}
Published data to topic: sensor_dummy/values
```

Analytics servise

Analytics service je mikroservis misan u .Netu. Koristi dodatne pakete za rad sa mqtt brokerom , a to je MQTTnet paket. Ovaj service je projektovan da takodje preko mqtt brokera prima podatke koje je poslao senzor service i vrsi neku analizu sa njima. Analiza se vrsi preko eKuipera , tako sto ovaj service salje podatke preko brokera koji se cuvaju u data streamu koje eKuiper kasnije preko definisanih pravila filtrira.

Izgled izlaza u konzoli nakon primanja podataka sa senzora i njihovo dalje slanje preko drugog topika ekuiper servisu :

```

MQTT client published message.
Message forwarded to analytics/values topic.
Received message on topic: sensor_dummy/values
Payload: {"Id":39,"City":"Hannover","Country":"Germany","Smart_Mobility":6420,"Smart_Environment":7878,"Smart_Government":6422,"Smart_Economy":6660,"Smart_People":5208,"Smart_Living":5690,"SmartCity_Index":6391,"SmartCity_Index_relative_Edmonton":-81}
MQTT client published message.
Message forwarded to analytics/values topic.
Received message on topic: sensor_dummy/values
Payload: {"Id":40,"City":"Strasbourg","Country":"France","Smart_Mobility":5620,"Smart_Environment":7570,"Smart_Government":6792,"Smart_Economy":7345,"Smart_People":5715,"Smart_Living":6750,"SmartCity_Index":6562,"SmartCity_Index_relative_Edmonton":90}
MQTT client published message.
Message forwarded to analytics/values topic.
Received message on topic: sensor_dummy/values
Payload: {"Id":41,"City":"Joensuu","Country":"Finland","Smart_Mobility":5045,"Smart_Environment":6730,"Smart_Government":6356,"Smart_Economy":8325,"Smart_People":5463,"Smart_Living":8710,"SmartCity_Index":6703,"SmartCity_Index_relative_Edmonton":230}
MQTT client published message.
Message forwarded to analytics/values topic.
Received message on topic: eKuiper/anomalies
Payload: {"City":"Joensuu","Country":"Finland","Id":41,"SmartCity_Index":6703,"SmartCity_Index_relative_Edmonton":230,"Smart_Economy":8325,"Smart_Environment":6730,"Smart_Government":6356,"Smart_Living":8710,"Smart_Mobility":5045,"Smart_People":5463}
Received message on topic: sensor_dummy/values
Payload: {"Id":42,"City":"Sydney","Country":"Australia","Smart_Mobility":6263,"Smart_Environment":3890,"Smart_Government":5932,"Smart_Economy":5075,"Smart_People":7305,"Smart_Living":9620,"SmartCity_Index":6442,"SmartCity_Index_relative_Edmonton":-30}
MQTT client published message.
Message forwarded to analytics/values topic.
Received message on topic: eKuiper/anomalies

```

EventInfo service

EventInfo service je poslednji servis koji je takodje radjen u node.js i expressu. Ovaj mikroservis definise api za manipulaciju filtriranih podataka koje dobijamo iz drugog mikroservisa i eKuipera. Ima definisanu jednu GET metodu koja sluzi za pribavljanje filtriranih podataka.

Izgled izlaza u konzoli nakon primanja podataka sa ekuiper servisa nakon filtiranja i njihova dalja obrada u servisu koji sluzi kao API:

```

Payload: {"City":"Zurich","Country":"Switzerland","Id":11,"SmartCity_Index":6984,"SmartCity_Index_relative_Edmonton":512,"Smart_Economy":6380,"Smart_Environment":8844,"Smart_Government":5856,"Smart_Living":7960,"Smart_Mobility":5782,"Smart_People":7200}
Received message on topic: eKuiper/anomalies
Payload: {"City":"Trondheim","Country":"Norway","Id":12,"SmartCity_Index":7039,"SmartCity_Index_relative_Edmonton":567,"Smart_Economy":4945,"Smart_Environment":7102,"Smart_Government":6686,"Smart_Living":9090,"Smart_Mobility":6492,"Smart_People":7558}
Received message on topic: eKuiper/anomalies
Payload: {"City":"Västerås","Country":"Sweden","Id":13,"SmartCity_Index":6771,"SmartCity_Index_relative_Edmonton":299,"Smart_Economy":5980,"Smart_Environment":8296,"Smart_Government":7840,"Smart_Living":7730,"Smart_Mobility":4683,"Smart_People":7065}
Received message on topic: eKuiper/anomalies
Payload: {"City":"Ottawa","Country":"Canada","Id":15,"SmartCity_Index":6852,"SmartCity_Index_relative_Edmonton":379,"Smart_Economy":4285,"Smart_Environment":5136,"Smart_Government":7550,"Smart_Living":9920,"Smart_Mobility":6793,"Smart_People":6703}
Received message on topic: eKuiper/anomalies
Payload: {"City":"Stavanger","Country":"Norway","Id":17,"SmartCity_Index":6818,"SmartCity_Index_relative_Edmonton":346,"Smart_Economy":5360,"Smart_Environment":7162,"Smart_Government":6600,"Smart_Living":9090,"Smart_Mobility":5317,"Smart_People":7595}
Received message on topic: eKuiper/anomalies
Payload: {"City":"Helsinki","Country":"Finland","Id":19,"SmartCity_Index":6920,"SmartCity_Index_relative_Edmonton":448,"Smart_Economy":7130,"Smart_Environment":6140,"Smart_Government":6580,"Smart_Living":8710,"Smart_Mobility":5765,"Smart_People":7523}
Received message on topic: eKuiper/anomalies
Payload: {"City":"Vancouver","Country":"Canada","Id":20,"SmartCity_Index":7152,"SmartCity_Index_relative_Edmonton":679,"Smart_Economy":7385,"Smart_Environment":5348,"Smart_Government":6726,"Smart_Living":9920,"Smart_Mobility":5975,"Smart_People":7725}
Received message on topic: eKuiper/anomalies
Payload: {"City":"Toronto","Country":"Canada","Id":22,"SmartCity_Index":6881,"SmartCity_Index_relative_Edmonton":409,"Smart_Economy":5885,"Smart_Environment":4712,"Smart_Government":6158,"Smart_Living":9920,"Smart_Mobility":6780,"Smart_People":7158}

```

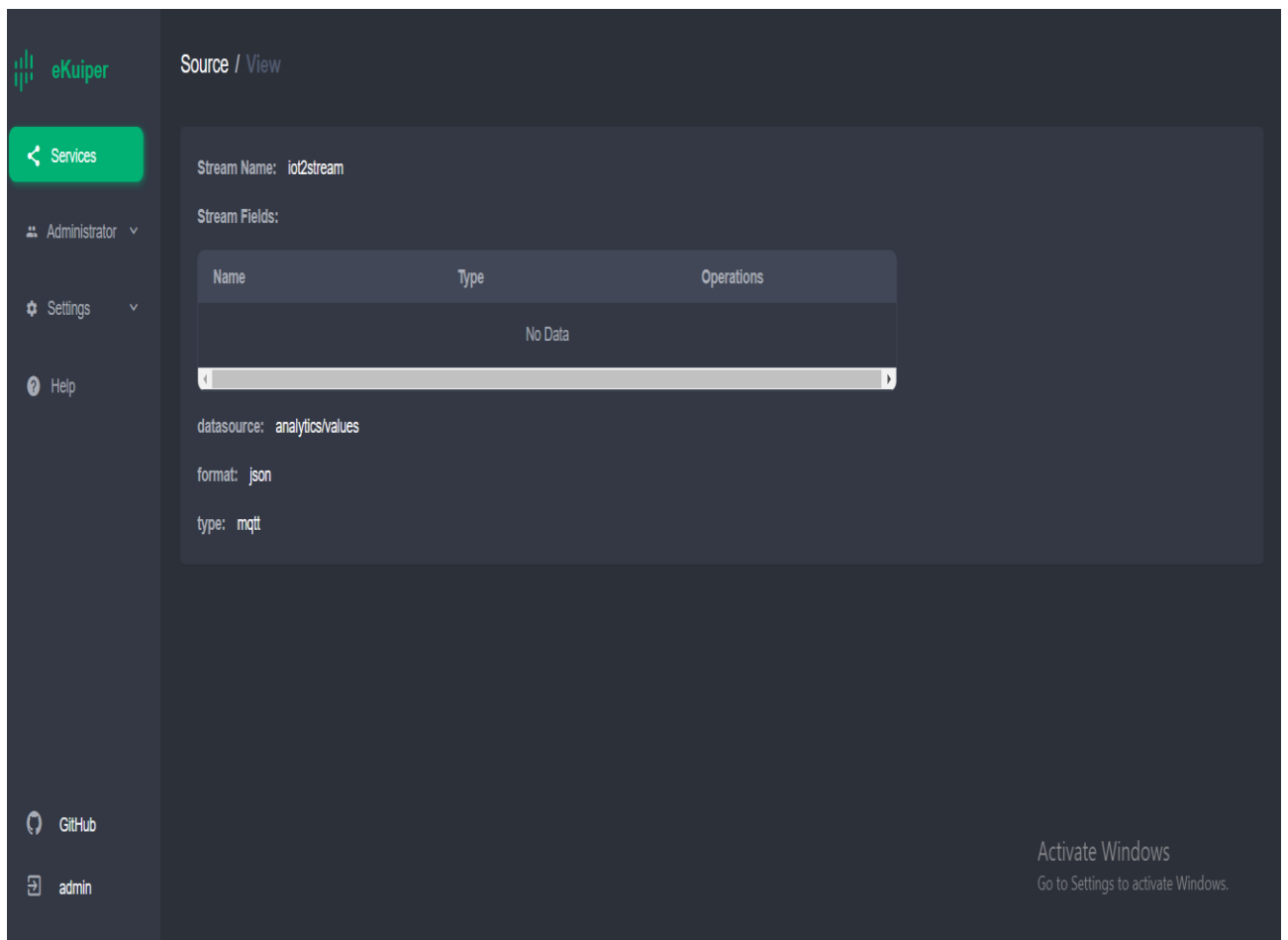
EKuiper service

U docker compose fajlu je kao default adresa za eKuiper postavljena lokalna adresa mog racunara zbog uspostavljanja konekcija svih servisa na istu mrežu, a i javlja se problem prilikom povezivanja na localhost. Takodje eKuiper dashboard je moguće otvoriti na sledecoj adresi: <http://192.168.99.100:9082>. Bitno je napomenuti da je potrebno da svi ostali kontejneri budu pokrenuti pre nego sto se pokrene sam eKuiper service. Logovanje se vrši sledecim podacima :

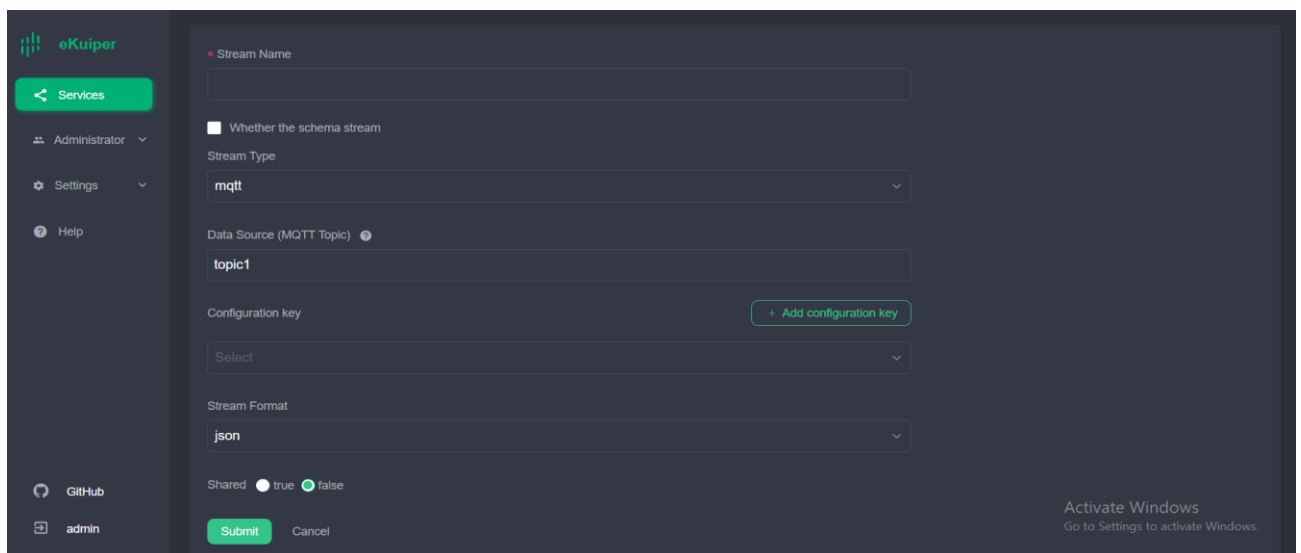
Username : admin

Password: public

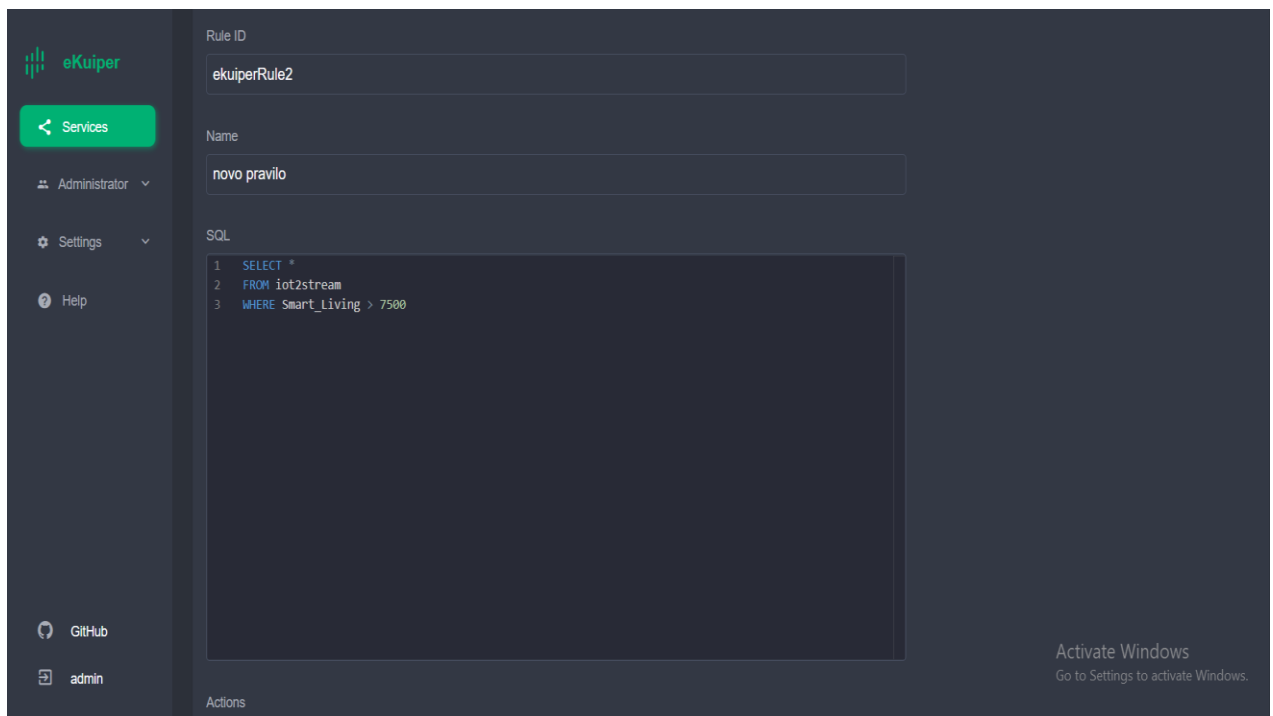
Nakon logovanja na eKuiper dashboard potrebno je kreirati data stream koji će primati podatke sa naseg mikroservisa . Potrebno je uneti sledece podatke vezane za data stream:



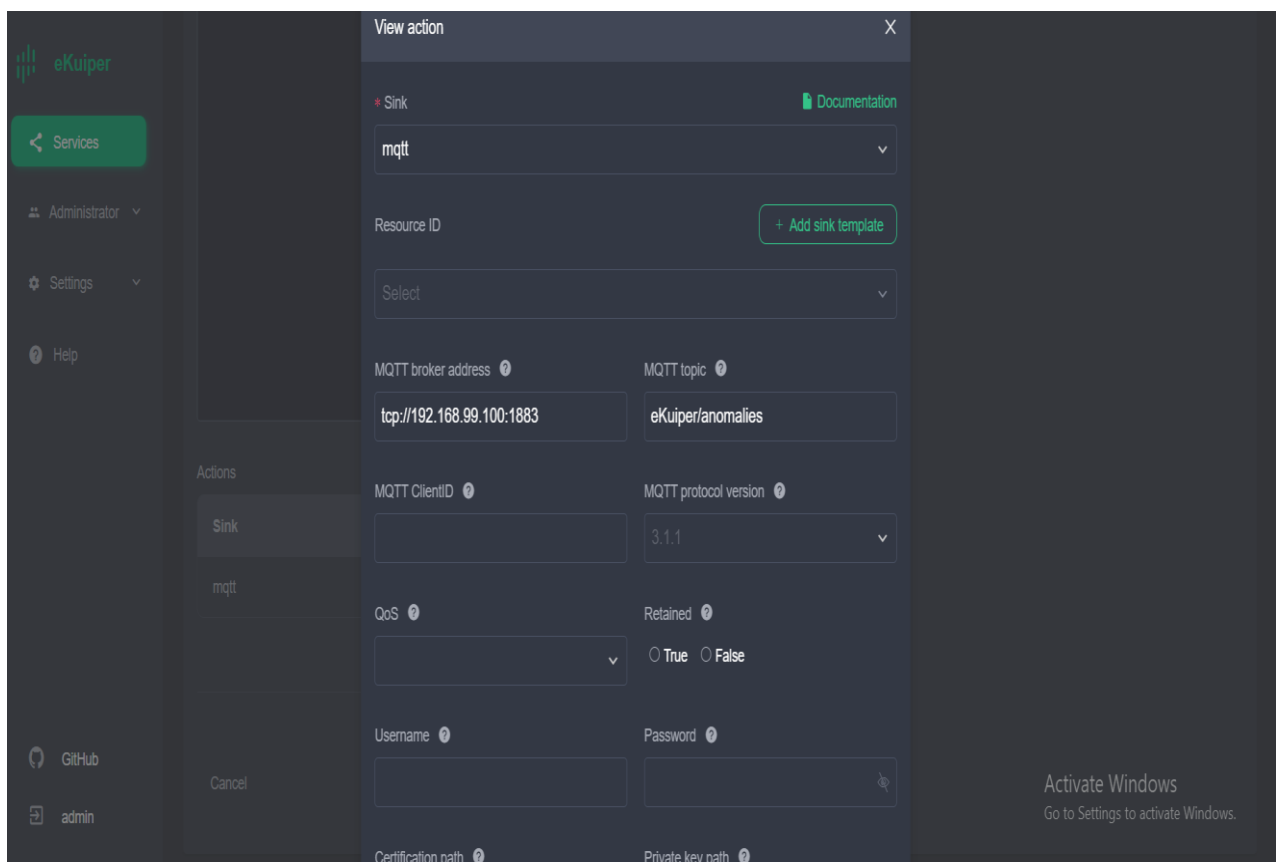
Forma koja se otvara nakon klika na dugme za kreiranje servisa je sledeca :



Nakon kreiranja streama potrebno je kreirati pravilo po kome ce se vrsiti filtriranje podataka :



Osim ovog pravila za filtriranje potrebno je dodati i akciju klikom na dugme +Add sa sledecim podacima :



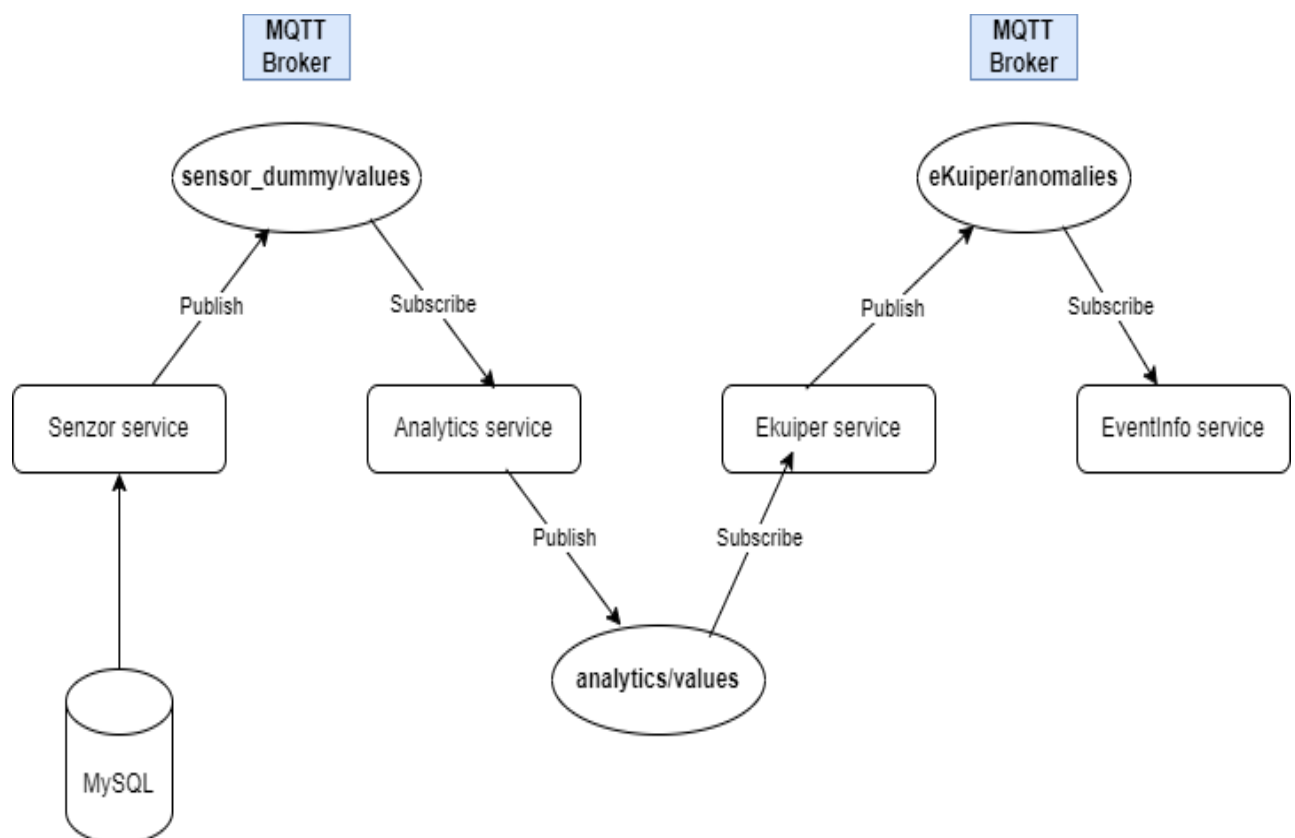
Nakon sto dodamo akciju, potrebno je ici na submit ovog pravila. Nakon sto se pokrene EMQX broker , pokrenuce se i samo pravilo. Medjutim moze se desiti da se

posle nekog vremena pravilo samo iskljuci pa ga je potrebno ponovo ukljuciti preko eKuiper dashboarda.

Pokretanje docker-compose fajla se vrši na sledeći način :

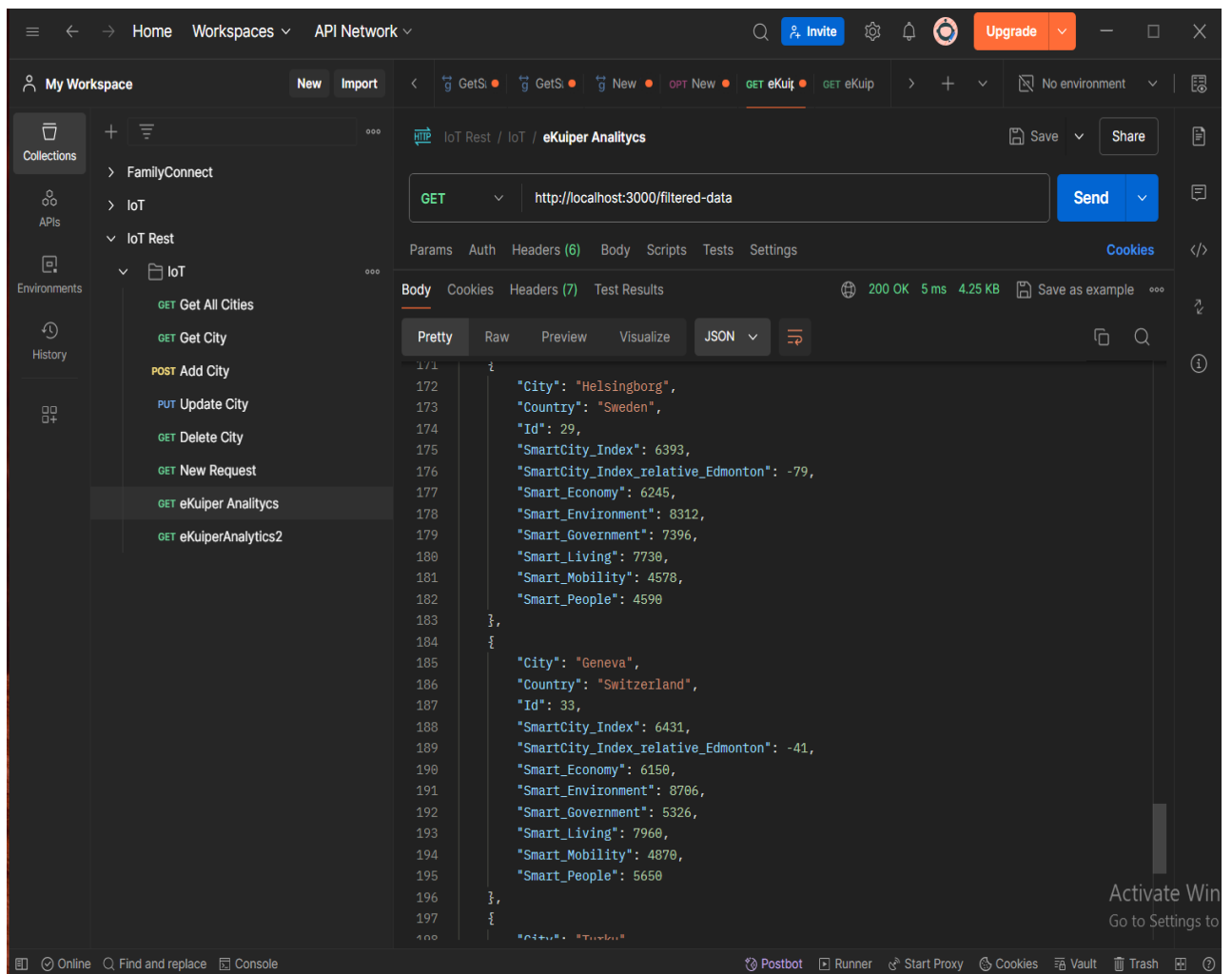
```
C:\Users\Stefan\Desktop\Faks\MMS\Projekat 2 backup>docker-compose -p my_ekuiper up -d
Starting mysql          ... done
Starting ekuiper-manager ... done
Starting emqx          ... done
Starting ekuiper       ... done
Starting my_ekuiper_event_dummy_1 ... done
Starting my_ekuiper_sensor_dummy_1 ... done
Starting my_ekuiper_analytics_1   ... done
C:\Users\Stefan\Desktop\Faks\MMS\Projekat 2 backup>
```

Ovde se nalazi arhitektura celog sistema :



Ovde se nalaze testovi metoda koje imamo u EventInfo servisu koji nam služi kao api , ovde su date 2 metode

- GET /Filtered-data , metoda koja nam vraća listu svih podataka koji ispunjavaju uslov postavljen u eKuiperu



- GET/last-data , metoda koja nam vraća podatak koji je poslednji pristigao od eKuiper servisa

HomeWorkspacesAPI Network

My Workspace

NewImport

Collections

FamilyConnect

IoT

IoT Rest

IoT

GET Get All Cities

GET Get City

POST Add City

PUT Update City

GET Delete City

GET New Request

GET eKuiper Analytics

GET eKuiperAnalytics2

IoT Rest / IoT / eKuiperAnalytics2

GEThttp://localhost:3000/last-data

Send

ParamsAuthHeaders (6)BodyScriptsTestsSettingsCookies

Query Params

Key	Value	Description	Bulk Edit
Key	Value	Description	

BodyCookiesHeaders (7)Test Results200 OK4 ms477 BSave as example

PrettyRawPreviewVisualizeJSON

```
1{"City": "Stockholm",
2  "Country": "Sweden",
3  "Id": 5,
4  "SmartCity_Index": 6812,
5  "SmartCity_Index_relative_Edmonton": 340,
6  "Smart_Economy": 4330,
7  "Smart_Environment": 7692,
8  "Smart_Government": 8354,
9  "Smart_Living": 7730,
10 "Smart_Mobility": 6122,
11 "Smart_People": 6743
12 }
13
```

Activate WinGo to Settings to

OnlineFind and replaceConsolePostbotRunnerStart ProxyCookiesVaultTrash