Analyzing EV Charging Infrastructure: A Data-Driven Approach

Implementation in NoSQL

Group 2

Rohan Verma

Priyansh Nileshbhai Vagadiya

617 459 9214

857 339 8070

verma.rohan@northeastern.edu

vagadiya.p@northeastern.edu

Percentage of Effort Contributed by Student1 : 50%

Percentage of Effort Contributed by Student2 : 50%

Signature of Student 1 : Rohan Verma

Signature of Student 2 : Priyansh Nileshbhai Vagadiya

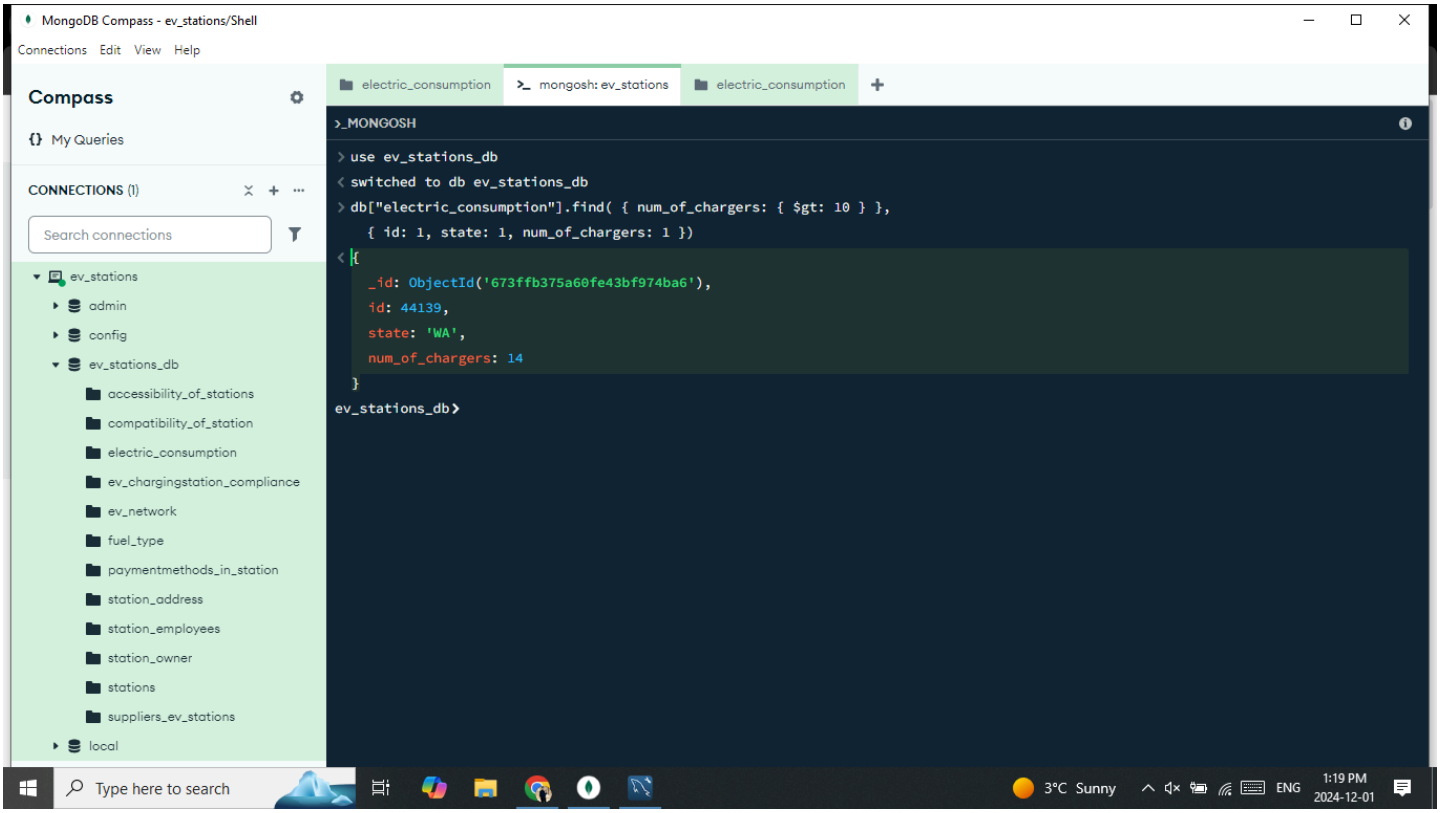
NoSQL Implementation:

Twelve collections representing various tables from the ***evstation*** *MySQL schema* have been created in MongoDB. These collections include data related to EV stations, chargers, and their operational details for efficient querying and analysis.

NoSQL Query 1 :

```
db.electric_consumption.find( { num_of_chargers: { $gt: 10 } }, { id: 1, state: 1, num_of_chargers: 1 } );
```

The query focuses on retrieving the charging stations that have more than 10 chargers, specifically in the state of Washington (WA). By using this query, we aim to identify larger charging stations that may have higher energy consumption, which can be useful for understanding infrastructure requirements, energy demands, and the potential impact on the local grid.
The query returns key information such as the station ID, state, and the number of chargers, helping to focus on stations with a significant capacity. This data is essential for further analysis related to energy usage, cost, and carbon footprint in the context of electric vehicle adoption.



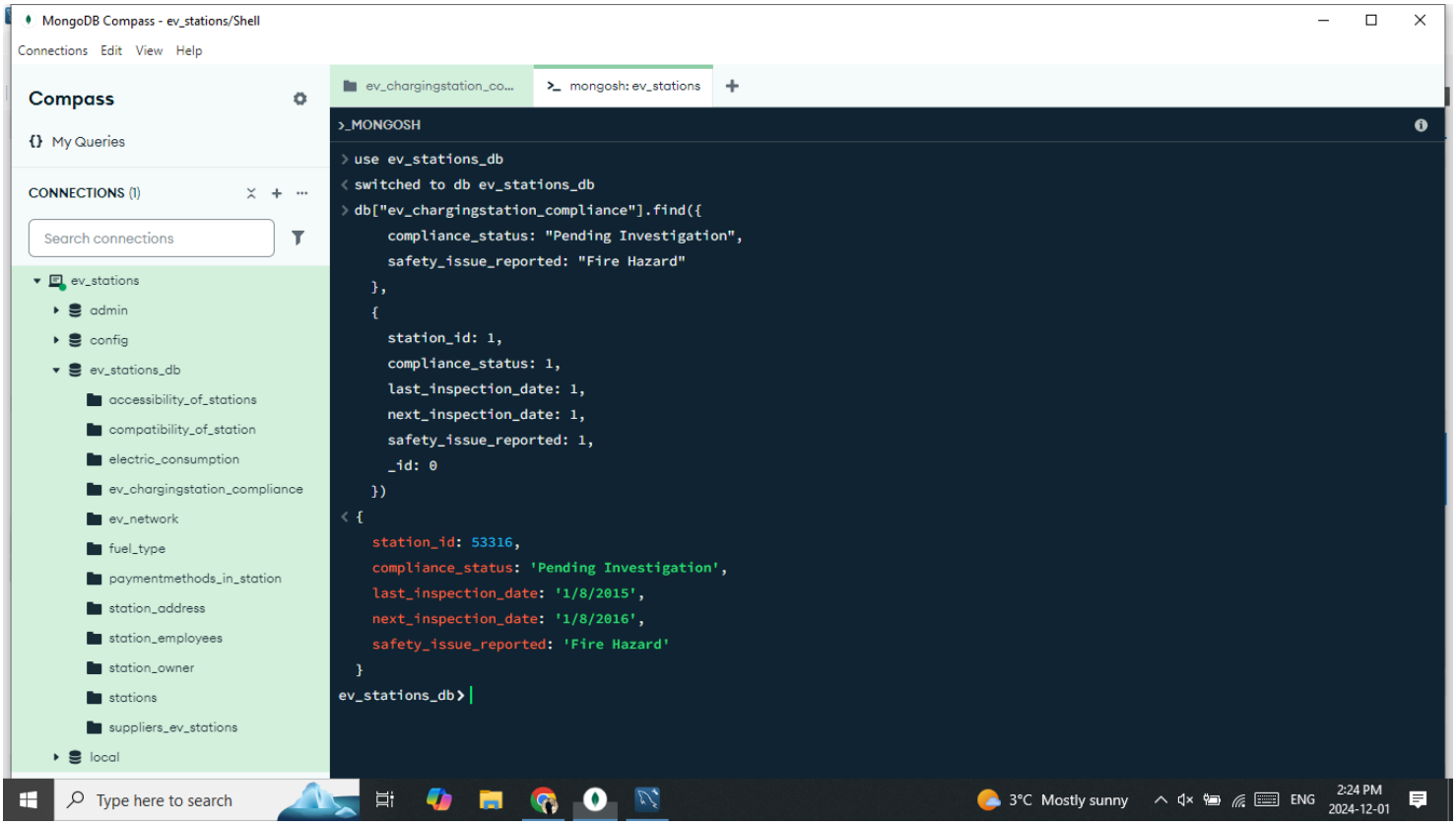
NoSQL Query 2 :

```
db["ev_chargingstation_compliance"].find({
   compliance_status: "Pending Investigation",
   safety_issue_reported: "Fire Hazard" },
{ station_id: 1, compliance_status: 1,  last_inspection_date: 1,  next_inspection_date: 1,
   safety_issue_reported: 1, _id: 0  })
```

This query retrieves details of all electric charging stations that have the compliance status "Pending Investigation" and have reported the safety issue "Fire Hazard". The query specifically fetches the following fields for matching documents:

- station_id: The unique identifier for the charging station.
- compliance_status: The compliance status of the station.
- last_inspection_date: The date of the last safety inspection.
- next_inspection_date: The scheduled date for the next safety inspection.
- safety_issue_reported: The description of the safety issue reported.

This information is essential for identifying stations that require immediate attention due to fire hazards while ensuring regulatory compliance and safety standards are maintained.



NoSQL Query 3 :

```
db["ev_network"].find({ ev_network_types: "Blink Network" },
  { station_id: 1, ev_network_types: 1, _id: 0 })
```

The query retrieves information about all the electric vehicle (EV) stations that are part of the **"Blink Network"** from the **ev_network** collection. The query specifically filters for records where the **ev_network_types** field is set to **"Blink Network"**. It then returns the *station_id* and *ev_network_types* for each matching station, excluding the *_id* field to simplify the result.

The query was executed successfully and returned data for 5 stations that belong to the "Blink Network". This query helps in identifying and analyzing the EV stations associated with this particular network.