Macrometa

Fleet Management

Hitachi

PRIVATE & CONFIDENTIAL

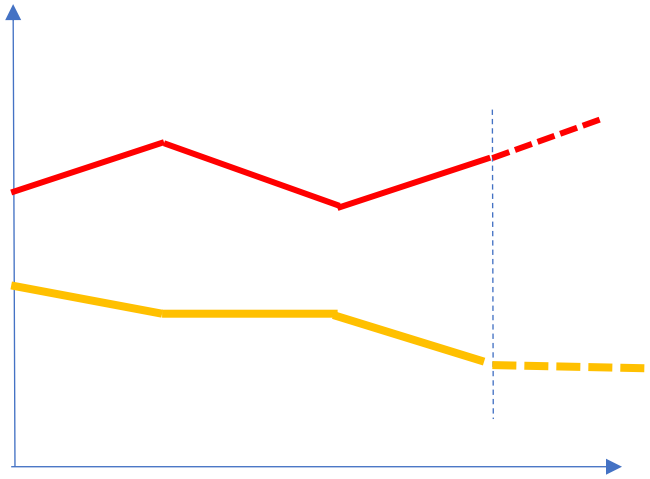
JUNE 2021

Macrometa - Realtime Fleet Management

Initialize | About

Start | Stop

Fleet Status



Week | Month | Year | All

Predicted

Attention Required (Next 7 Days)	▲	1048
Critical Status (Next 7 days)	▼	374
Fleet Health (Last 7 Days)	▼	89.04%
Unplanned Maintenance (last 7 Days)	▲	171
Planned Maintenance (Next 7 Days)	▲	234
Predicted Maintenance	▲	35.69%

Insights

Vehicle With Most Frequent Issues	PF16VBD	Investigate
Most Common Alert	Brakes	Investigate
Average Driver Behaviour	Good	Investigate
Total Cost of Unplanned Maintenance	£4,230	Investigate
Area with most critical Alerts	Manchester	Investigate
Least Cost Effective Vehicle	Ford Transit	Investigate

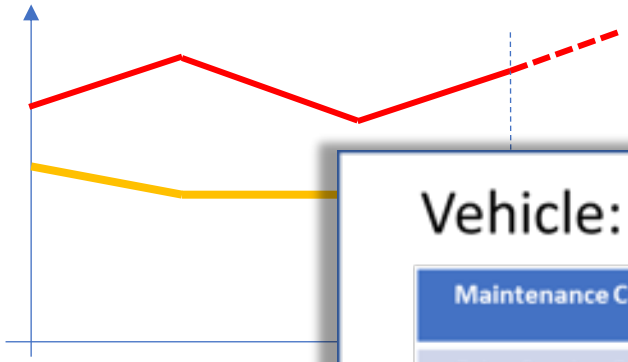
Alerts

All (202) | Critical (23) | Attention (75) | Booked (104)

Vehicle ID	Alert Description	Date Logged	Status Level	Maintenance Planned	Suggested Action
PF16VBD	No Start	Just Now	Critical	No	Book
GD67GGU	Flat Battery	Last Hour	Critical	Yes	Booked 25 Aug 2021
GD67GGF	Steering	Today	Attention	Yes	Book
GD17XOC	Brake Lights	Yesterday	Attention	No	Book
GD66LLD	Water Pump	10 June 2021	Attention	Yes	Booked 13 Sept 2021
GD17XNE	Radiator	10 June 2021	Attention	Yes	Booked 13 Sept 2021

⏮ ◀◀ 1 2 3 4 5 6 7 ▶▶ ⏭

Fleet Status



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Week | Month | Ye

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Alerts

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Vehicle ID	Alert Description	Date Logged	Status Level	Maintenance Planned	Suggested Action
				No	Book
				Yes	Booked 25 Aug 2021
				Yes	Book
				No	Book
				Yes	Booked 13 Sept 2021
GD17XNE	Radiator	10 June 2021	Attention	Yes	Booked 13 Sept 2021
PF66BXO	NOS	7 June 2021	Attention	No	Book

⏮ ◀◀ 1 2 3 4 5 6 7 ▶▶ ⏭

Vehicle: PF16VBD

Maintenance Centre	Rating	Location	Estimated Time	Estimated Cost	Select
Prius Service Centre	5.0/5.0	Liverpool	1 Day	£90.50	Select
Audi Service Centre	3.9/5.0	Liverpool	1 Day	£61.50	Select
Earlsfield Care	4.4/5.0	Liverpool	2 Days	£92.00	Select
IC Motors	5.0/5.0	Liverpool	1 Day	£84.00	Select
HMC Fleet Maintenance	1/5.0	Liverpool	2 Day	£99.50	Select

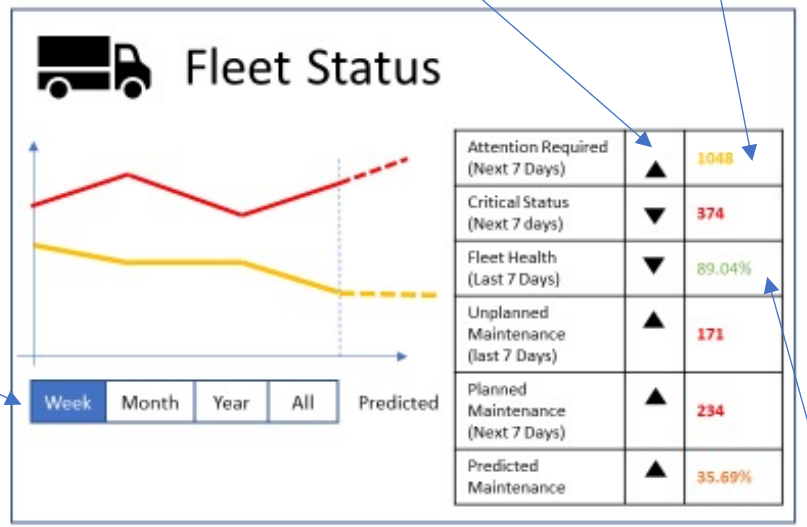
Arrows show change more/less over previous numbers

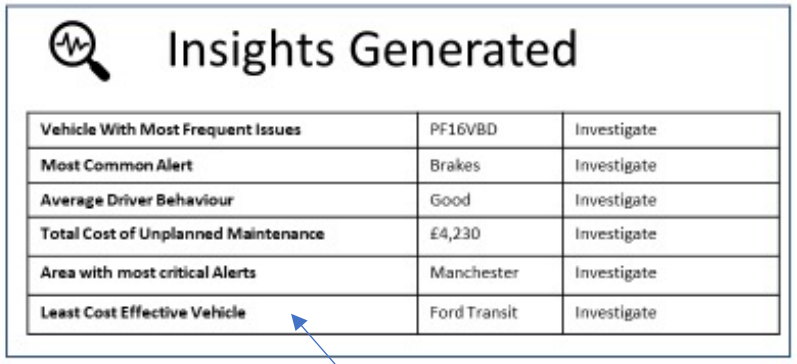
Calculated Insights

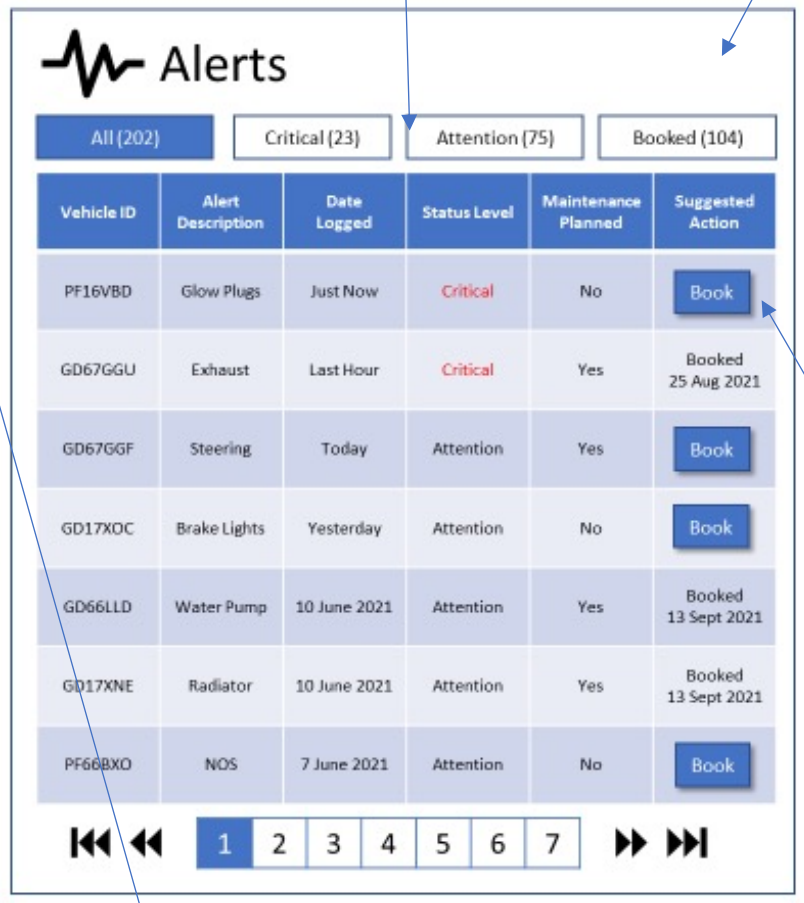
Filter on status level

Telematics & Brake downs

Filter on time frame







Book button takes to maintenance centre selection

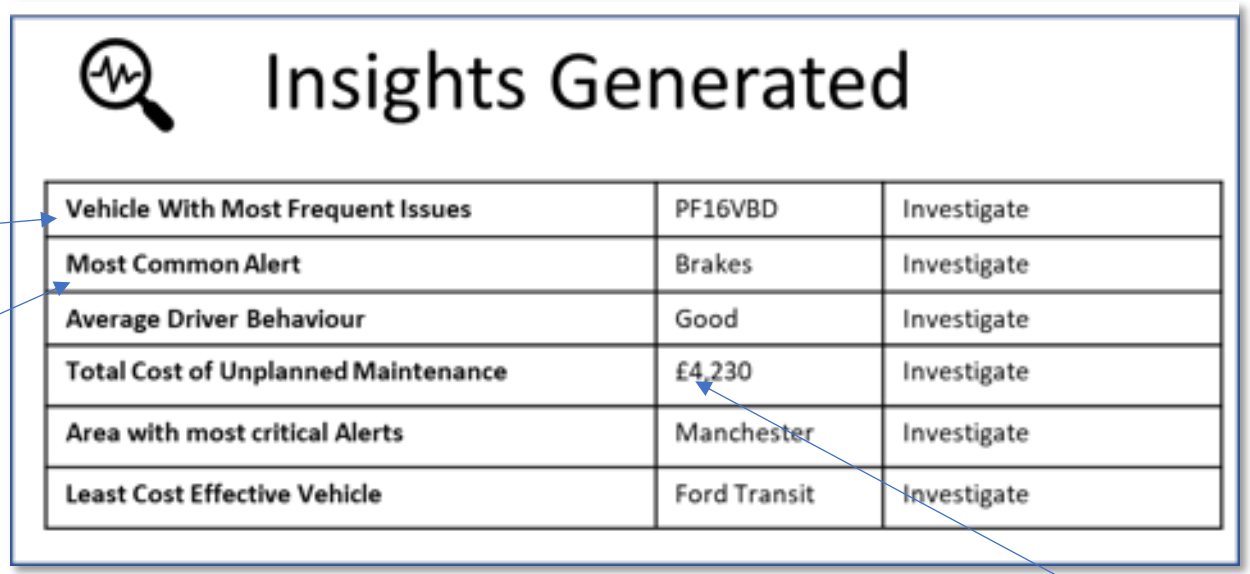
Calculated Insights

Fleet heath = % of Vehicles that are not critical or require attention

Add up unplanned maintenance costs

Calculate which Vehicle has had the most faults?

Calculate which fault comes up the most?



Insights Generated

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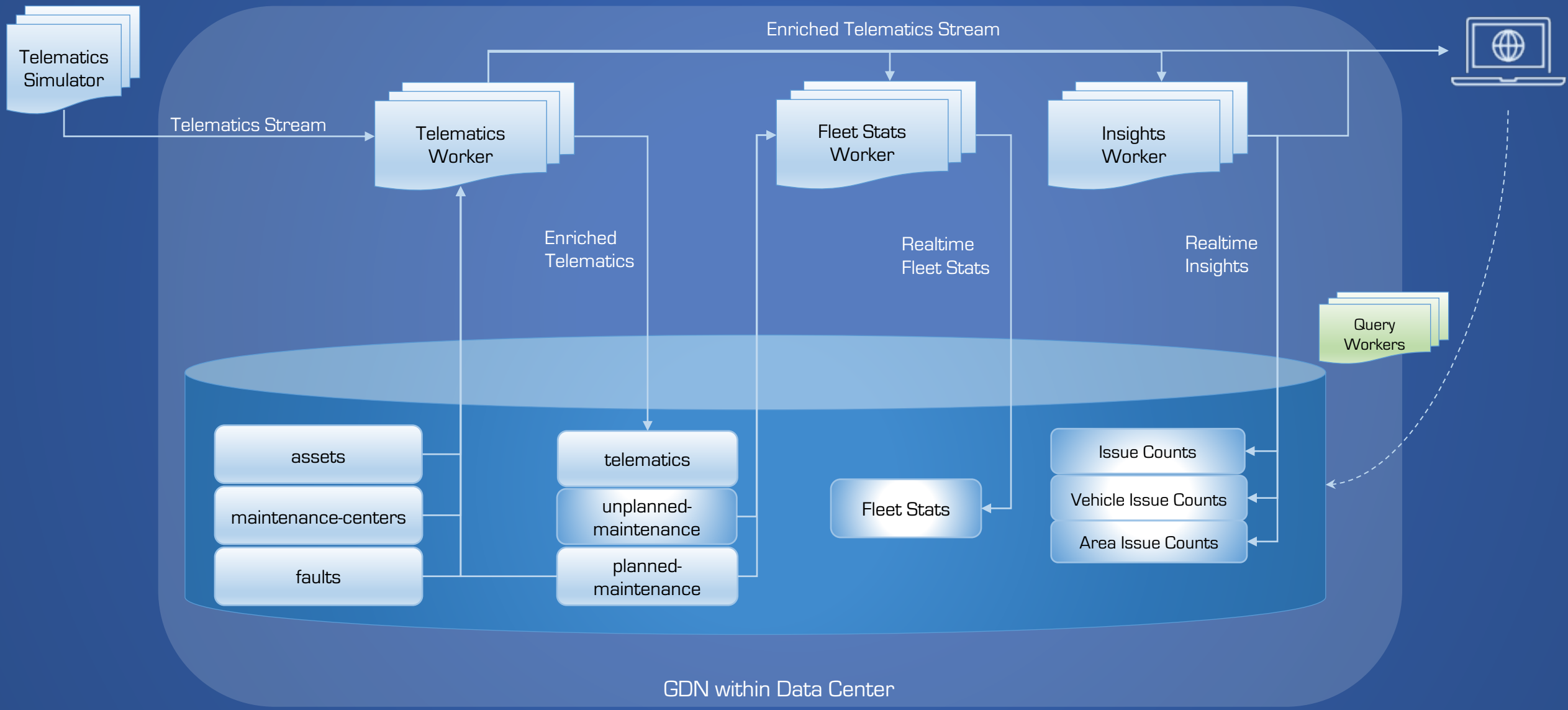
Add up unplanned maintenance costs

Fleet Management - Solution Architecture



Solution Architecture – Collections

Assets

{
"Name": "Halfords",
"Rating": "5.0/5.0",
"Estimated_Cost": "£54.77", ←Random
"Estimated_Time": "1 Day", ←Random
"Address": "99 Street name"
"City": "Liverpool", □ used for lookup
"Post Code": "LP189XP"
"Model": "Ford Transit"
}

Faults

{
"Fault": "No Start",
"Status_level": "Critical/Attention Required"
}

Planned Maintenance

{
"Asset": "HG16PRU",
"Booked_In": "9/Feb/2021:10:24:00",
"Invoice_Number": "1234567",
"Cost Centre": "12345",
"Vehicle_Description": "Ford Transit",
"Driver": "Lastname, Firstname",
"Work_Description": "Fix Brakes",
"Work_Cost": "£54.77"
}

Maintenance Centers

{
"Name": "Halfords",
"Rating": "5.0/5.0",
"Estimated_Cost": "£54.77", □ Random
"Estimated_Time": "1 Day", □ Random
"Address": "99 Street name"
"City": "Liverpool", □ used for lookup
"Post Code": "LP189XP"
}

Telematics

{
"Asset": "HG14PRU",
"Timestamp": 9/Feb/2021:10:34:00",
"Driver": "Lastname, Firstname",
"Fault": "Brakes",
"Address": "99 Street name"
"City": "Liverpool",
"Post Code": "LP189XP"
"Status_Level": "Critical/Attention" ←Derived
"Maintenance": "Yes/No" ← Derived
"Booked_In" : "Date" ← Derived
}

Unplanned Maintenance

{
"Asset": "HG16PRU",
"Booked_In": "9/Feb/2021:10:24:00",
"Invoice_Number": "1234567",
"Cost Centre": "12345",
"Vehicle_Model": "Ford Transit", ← Lookup
"Driver": "Lastname, Firstname", ← Lookup
"Work_Description": "Fix Brakes",
"Work_Cost": "£54.77",
}

Solution Architecture – Collections & Indices

Fleet Stats


```
{
  “Date”: “9/Feb/2021:00:00:00”,
  “Attention_Required”: “50”,
  “Critical_Status”: ”25”,
  “Planned_Maintenance”: “30”,
  “Unplanned_Maintenance”: “10”,
  “Predicted_Maintenance”: “0”
}
```


Vehicle Issue Counts


```
{
  “Asset”: “HG14PRU”,
  “Model”: “Ford Transit”,
  “Count”: “20”,
  “Total_Cost”: “$200”
}
```


Indices

- Asset ← Persistent Hash Index
- City ← Persistent Hash Index
- Fault ← Persistent Hash Index
- Date ← Persistent Hash Index
- Vehicle Model ← Persistent Hash Index

Issue Counts


```
{
  “Fault”: “No Start”,
  “Count”: “20”
}
```


Area Issue Counts


```
{
   “City”: “Manchester”,
   “Count”: “20”
}
```

Solution Architecture – Buttons Behavior

Start

1. Start Telematics Worker
2. Start Fleet Stats Worker
3. Start Insights Worker
4. Start Telematics Simulator

Pre-Requisites:

- Check Demo_Status collection has a document with {"ready": "true"}
- Disable Start Button till "Ready==True"

Simulator Notes:

- Generate 3 telematics alerts every 3 seconds.
- Telematic alert composition every 3 seconds:
    - 2 Planned Maintenance
    - 1 Unplanned Maintenance
- Read from Telematics collection 3 random alerts maintaining above alert composition and change the timestamps to current time before publishing these alerts.

Initialize

1. Truncate all collections

2. Load seed data for collections:
    - Assets,
    - Maintenance Centers
    - Planned Maintenance
    - Telematics

3. Generate data for derived collections:
    - Fleet Stats
    - Issue Counts
    - Area Issue Counts
    - Vehicle Issue Counts

4. Populate Demo_Status Collection
    - {"ready" : "true"}

Stop

1. Stop Telematics Simulator
2. Stop Telematics Worker
3. Stop Fleet Stats Worker
4. Stop Insights Worker

Solution Architecture – Stream Workers & Query Workers

Telematics Worker

1. Check if the vehicle is in “planned maintenance” collection with a future date and set “Maintenance_Planned” field to Yes/No accordingly.
2. Check the Fault Severity in Faults collection using “Alert Description” in the alert. Set accordingly the status level to “Critical/Attention”
3. Populate Telematics Collection.

Fleet Stats Worker

1. Create a document for the current day if not present.
2. For each alert, update Fleet Stats document for the current day i.e., increment applicable counts
    1. Attention_Required
    2. Critical_Status
    3. Planned_Maintenance
    4. Unplanned_Maintenance
    5. Predicted_Maintenance

Insights Worker

1. For each alert, update the following collections and increment respective counts
    1. Issue Counts
    2. Vehicle Issue Counts & Cost
    3. Area Issue Counts

Query Workers

1. Get Alerts (X days) – Default (X = 30 days) ← This is to show the Alerts table in dashboard. Update the Alerts table in real time as well..
2. Get Insights – Return all Insights together ← This is to show the insights table in dashboard. Update it every 3 seconds
3. Get Stats (X days) – Default (X = 30 days) ←This is to show fleet status table in dashboard. Update it every 3 seconds.
4. Get Total Unplanned Maintenance Cost