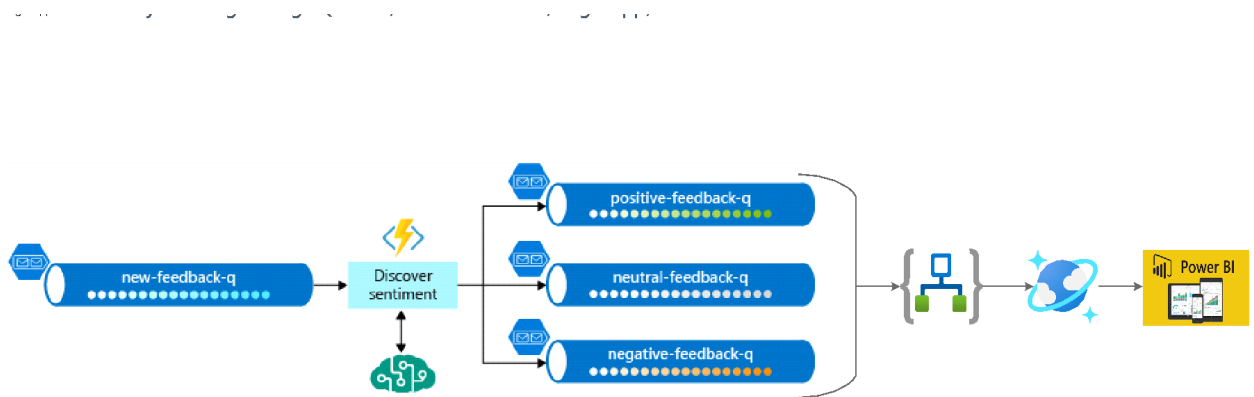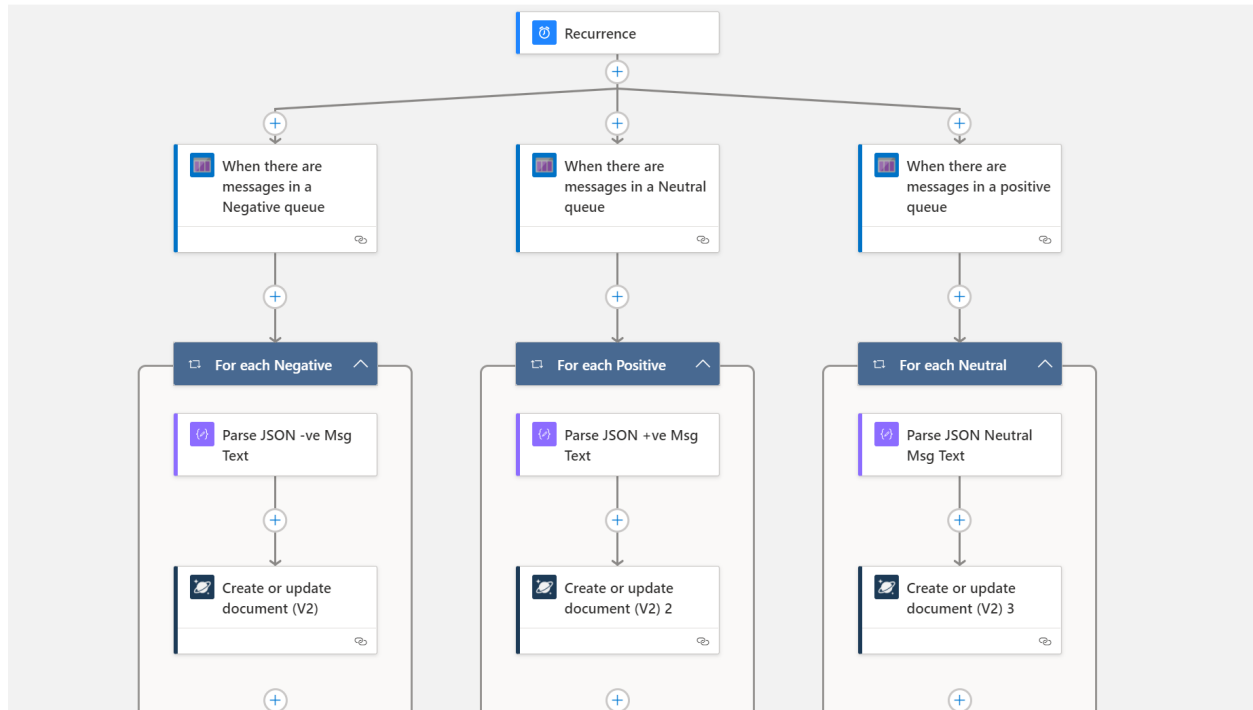# Sentiment Analysis with Storage Queues, Azure Function, Logic Apps, Cosmos DB, and Power BI

High-Level Overview of the solution

Sentiment Analysis Using Storage Queues, Azure Functions, LogicApps, CosmosDB and PowerBI

1. In the Azure portal, create an empty logic app by following the instructions in Create your logic app. When you see the **Logic Apps Designer**, return to this tutorial.
2. Once you are done with the logic app, it will look like this

3. The cosmos DB account and database have already been created. You have to create the collection with the name of your choice. For example, I created a collection with the name queue1.


```json
{
    "originalMessage": "Time to go to bed",
    "score": 0.7976418137550354,
    "id": "f3ccb687-9b39-486f-8609-227cddbef46c",
    "MessageArrivalTime": "2021-03-20T03:21:15.5065883Z",
    "_rid": "uml+AKLvSwgHAAAAAAAAAA==",
    "_self": "dbs/uml+AA==/colls/uml+AKLvSwg=/docs/uml+AKLvSwgHAAAAAAAAAA==/",
    "_etag": "\"0800c031-0000-0100-0000-60556a2b0000\"",
    "_attachments": "attachments/",
    "_ts": 1616210475
}
```

4. Make sure you select stateful workflow in the logic app, not the stateless. In the Logic Apps Designer, add recurrence action. It will run will logic app based on the time interval we want it to run.
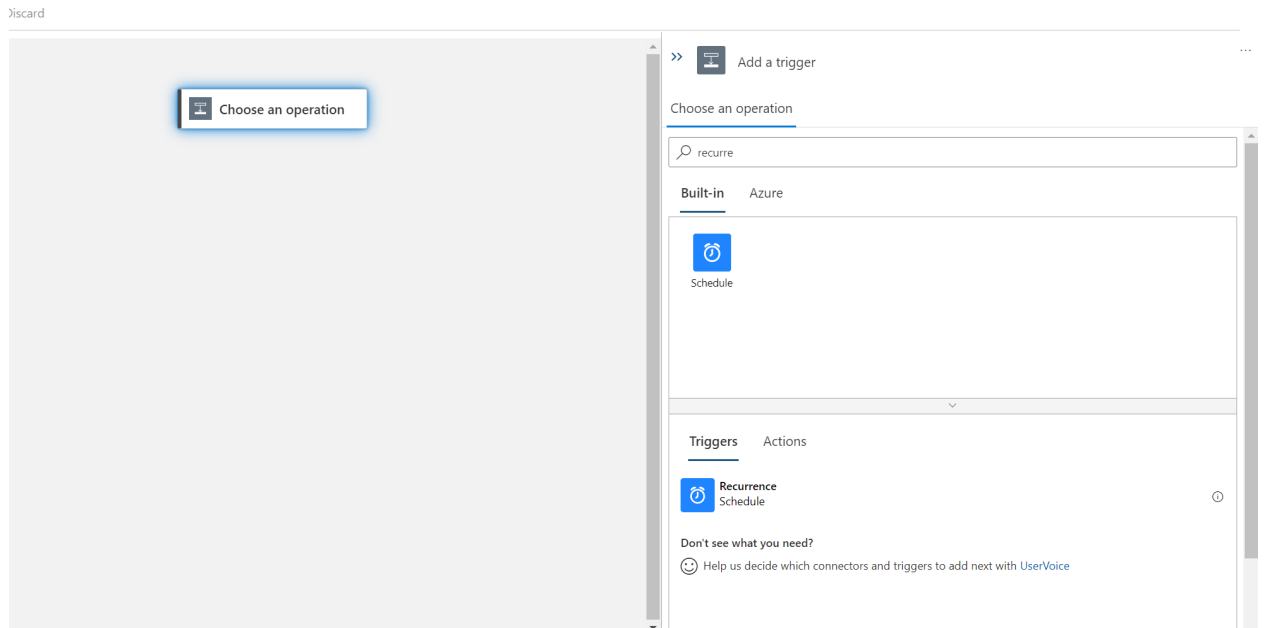
5. Select trigger "when there are messages in the queue" and provide the queue name; for example, For positive messages, provide queue name positive-feedback-q. Add a parallel step by clicking + sign and create the trigger for

negative and neutral queue also.
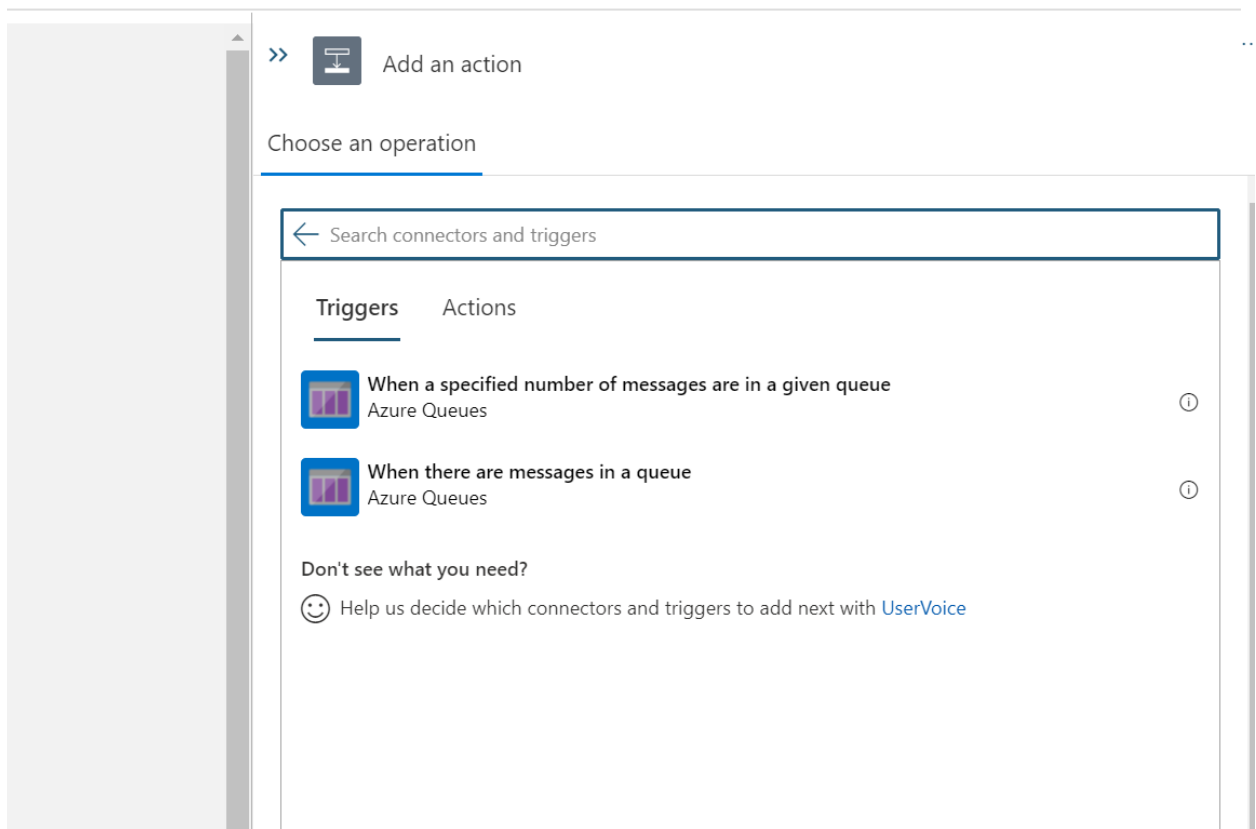
6. Add "For Each" loop as we have to process all arrived messages in the queue. Inside 'For Each' add ParseJson action. As queue messages are stored as JSON, we have to parse and select the fields we want for our analysis. We are ignoring some default fields added by queue metadata.

   1. Add "queuemessage" from the previous step as a parameter in For Each loop
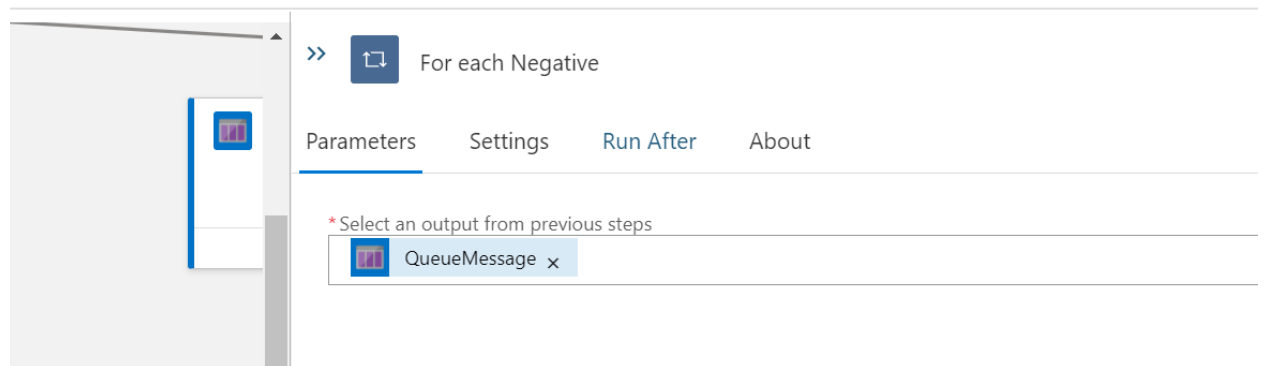
2. For ParseJSON, select the message text and Provide the below schema

```json
{
    "properties": {
        "originalMessage": {
            "type": "string"
        },
        "score": {
            "type": "number"
        }
    },
    "type": "object"
}
```

Add an action

Choose an operation

Search connectors and actions

Triggers | **Actions**

Compose
Data Operations ⓘ

Create CSV table
Data Operations ⓘ

Create HTML table
Data Operations ⓘ

Filter array
Data Operations ⓘ

Join
Data Operations ⓘ

Parse JSON
Data Operations ⓘ

Select
Data Operations ⓘ

```
Parse JSON -ve Msg Text

Parameters    Settings    Code View    Static Result    ...

* Content                    [  Message Text  x
                             ]

* Schema
{
    "properties": {
        "originalMessage": {
            "type": "string"
        },
        "score": {
            "type": "number"
        }
    },
    "type": "object"
}

Use sample payload to generate schema
```
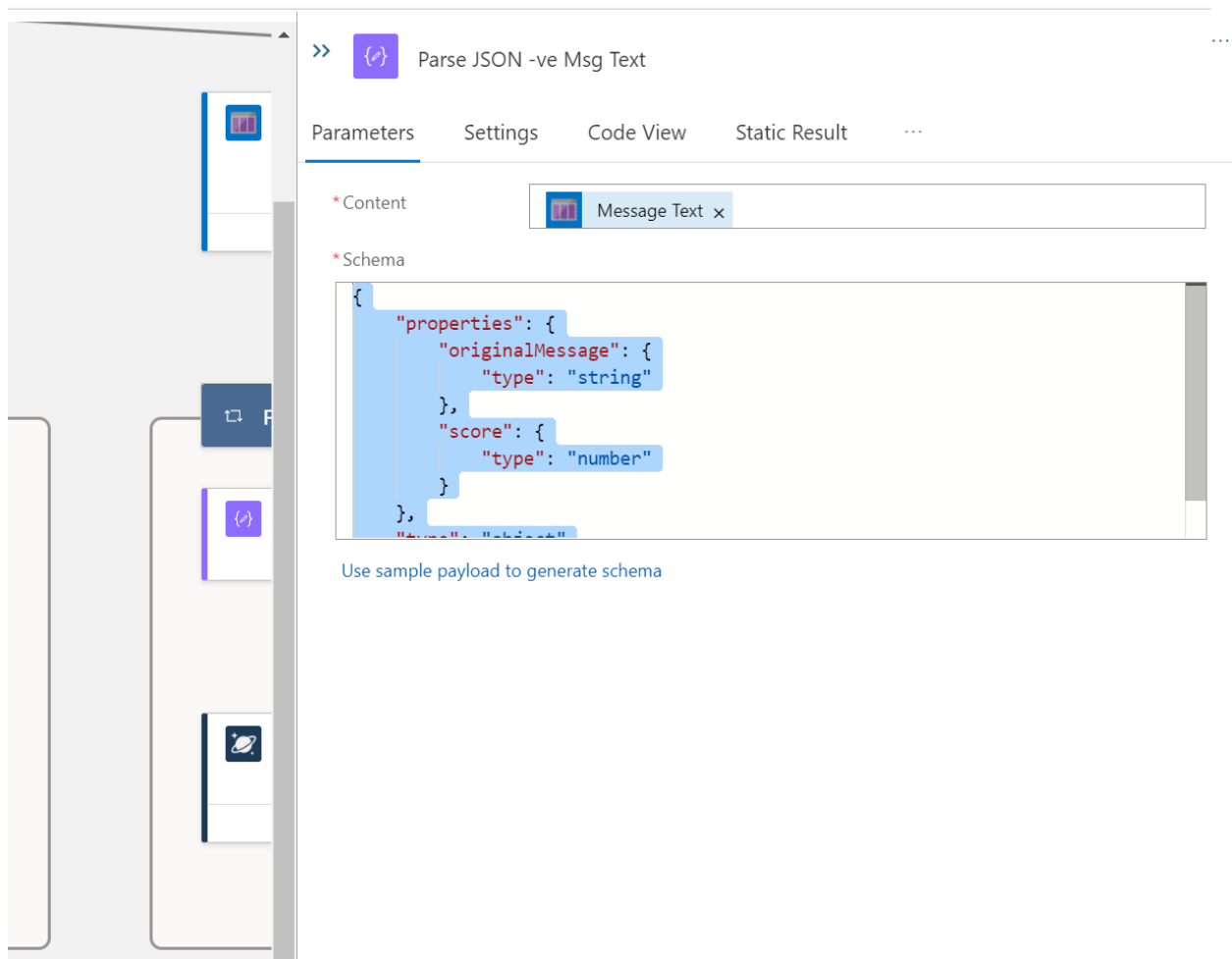
Complete these steps for all three message types.

7. Inside 'For Each' after ParseJSON action, add 'Create or update document (V2) (preview)' to insert messages into cosmos DB collection.
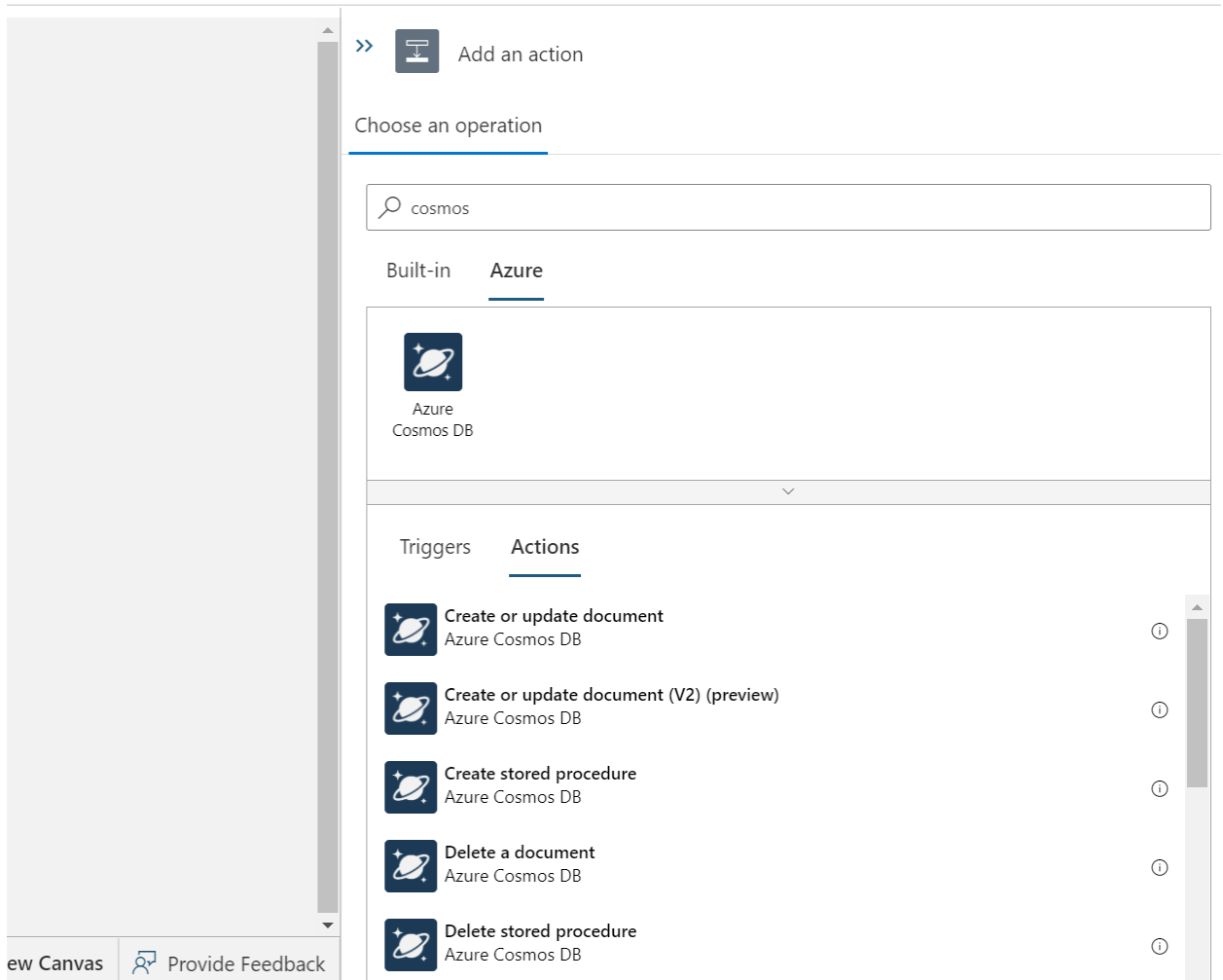
8. In parameter for 'Create or update document (V2) (preview)' Select database ID as "sentimemntanalysisqueue" and Collection as queue1 and under document user dynamic content and function to insert message and add ID field for uniqueness. The formula looks like this

USING: Azure LogicApps (PREVIEW) as of 3/22/2021

```
setProperty(setProperty(body('Parse_JSON_+ve_Msg_Text'),'id',guid()),'MessageArrivalTime',utcNow())
```

or USING: Azure LogicApps (GA) as of 3/22/2021

```
setProperty(setProperty(body('Parse_JSON_+ve_Msg_Text'),'id',guid()))
```
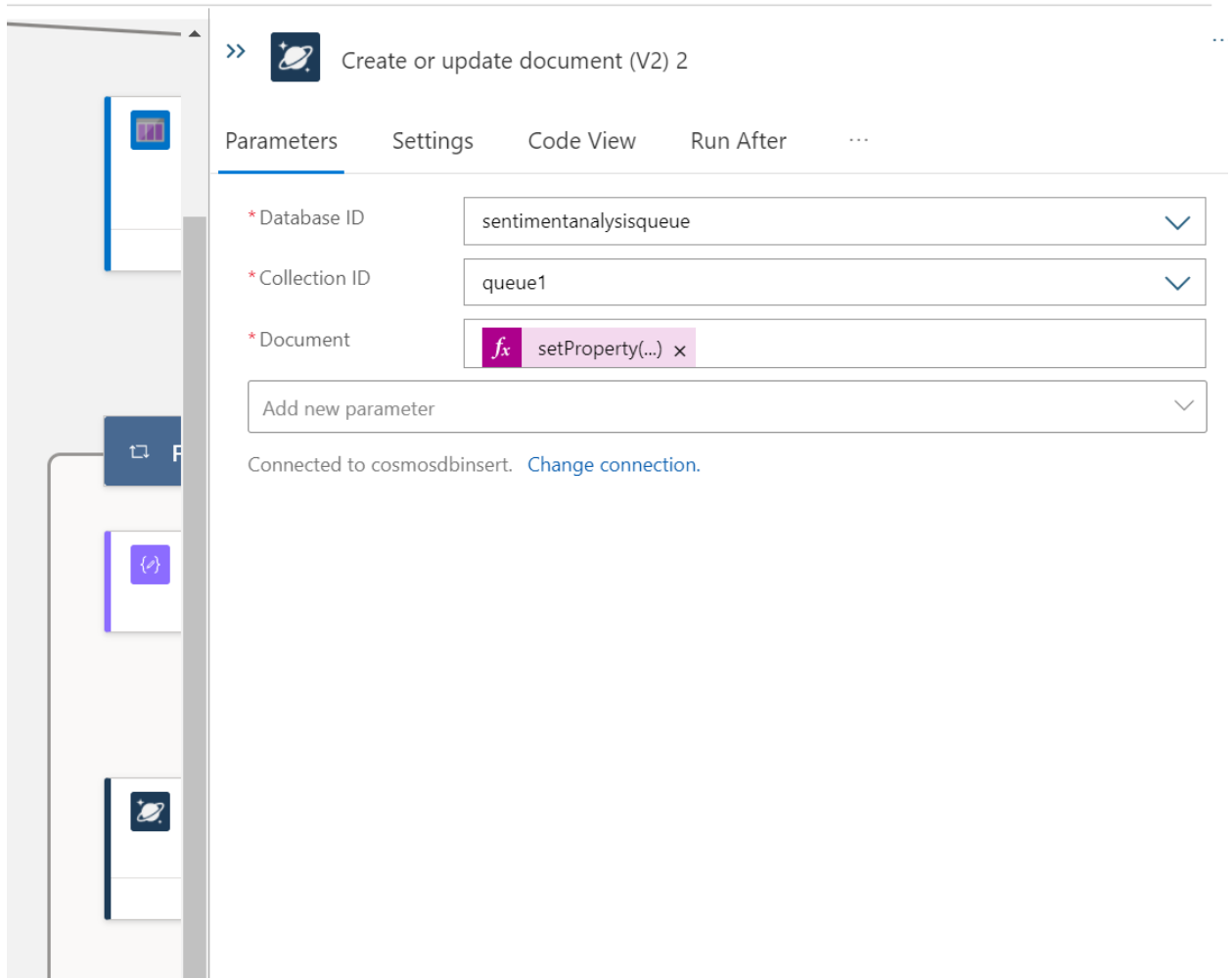

Complete above cosmos DB steps for all three message types.

9. Once you are done with step 8, your logic app should look like this

```
                          ┌─────────────────────┐
                          │  ⏱  Recurrence      │
                          └─────────────────────┘
                                    ⊕
          ┌─────────────────────────┼─────────────────────────┐
          ⊕                         ⊕                         ⊕
┌───────────────────────┐ ┌───────────────────────┐ ┌───────────────────────┐
│ ▦ When there are      │ │ ▦ When there are      │ │ ▦ When there are      │
│   messages in a       │ │   messages in a Neutral│ │   messages in a positive│
│   Negative queue      │ │   queue               │ │   queue               │
│                    ⊚  │ │                    ⊚  │ │                    ⊚  │
└───────────────────────┘ └───────────────────────┘ └───────────────────────┘
          ⊕                         ⊕                         ⊕
┌───────────────────────┐ ┌───────────────────────┐ ┌───────────────────────┐
│ ▭ For each Negative ⌄ │ │ ▭ For each Positive ⌄ │ │ ▭ For each Neutral  ⌄ │
└───────────────────────┘ └───────────────────────┘ └───────────────────────┘
│                       │ │                       │ │                       │
│ ┌───────────────────┐ │ │ ┌───────────────────┐ │ │ ┌───────────────────┐ │
│ │ {·} Parse JSON    │ │ │ │ {·} Parse JSON    │ │ │ │ {·} Parse JSON    │ │
│ │    -ve Msg Text   │ │ │ │    +ve Msg Text   │ │ │ │    Neutral Msg Text│ │
│ └───────────────────┘ │ │ └───────────────────┘ │ │ └───────────────────┘ │
│          ⊕            │ │          ⊕            │ │          ⊕            │
│ ┌───────────────────┐ │ │ ┌───────────────────┐ │ │ ┌───────────────────┐ │
│ │ ◍ Create or update│ │ │ │ ◍ Create or update│ │ │ │ ◍ Create or update│ │
│ │   document (V2)   │ │ │ │   document (V2) 2 │ │ │ │   document (V2) 3 │ │
│ │                ⊚  │ │ │ │                ⊚  │ │ │ │                ⊚  │ │
│ └───────────────────┘ │ │ └───────────────────┘ │ │ └───────────────────┘ │
│          ⊕            │ │          ⊕            │ │          ⊕            │
```
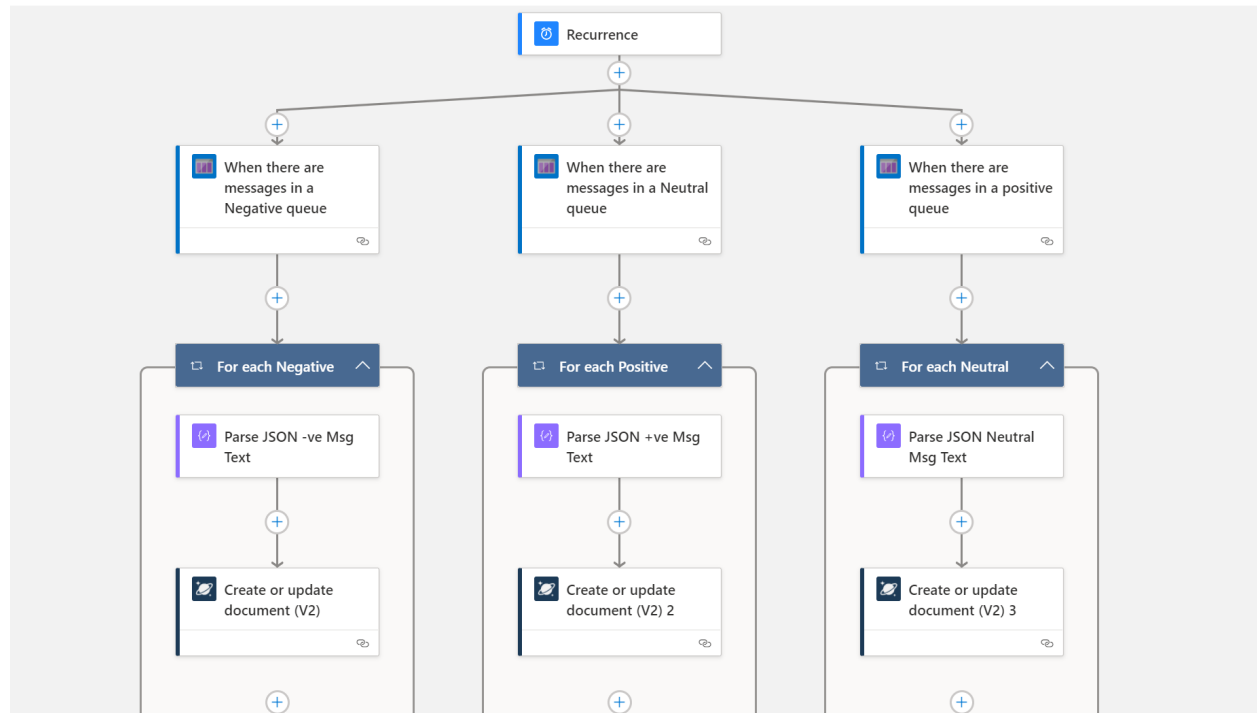
10. If you want to change the recurrence time, then go to recurrence trigger.

11. Save the Logic App and Monitor its run by going to monitor on the left side.

12. You can to CosmosDB and look for messages inserted in the collection.

New Item   Update   Discard   Delete   Upload Item

SQL API

DATA
▼ sentimentanalysisqueue
   Scale
   ▶ 🗂 queue1

NOTEBOOKS
📄 Gallery
▼ My Notebooks

Items ×

SELECT * FROM c   Edit Filter

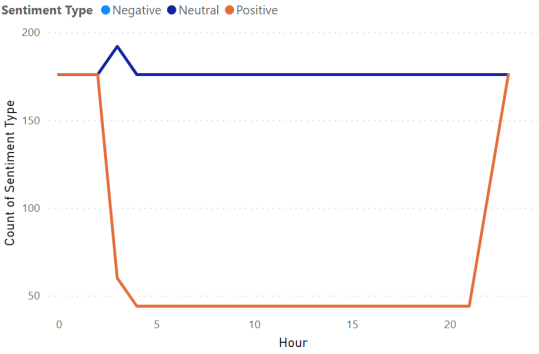| id	/id
ef35d7c5-76d4-4...	ef35d7c5-76d4-4557-a...
c38dc640-528d-4...	c38dc640-528d-4988-...
b7fbc099-8849-4...	b7fbc099-8849-463c-8...
e5410c5b-0459-4...	e5410c5b-0459-434f-a...
9e996d7d-d225-4...	9e996d7d-d225-428e-...
8f9f380a-3810-45...	8f9f380a-3810-452a-b...
f3ccb687-9b39-4...	f3ccb687-9b39-486f-8...
62c33e03-64dd-4...	62c33e03-64dd-4426-...
92b6b4ea-5ab5-4...	92b6b4ea-5ab5-498a-...
2b08b300-773f-4...	2b08b300-773f-45e1-...
57470f95-e83e-4...	57470f95-e83e-49cd-a...
c69c6c57-7592-4...	c69c6c57-7592-4e24-9...
4dee004b-ce1b-4...	4dee004b-ce1b-4864-...
31269a68-37f6-4...	31269a68-37f6-4c87-9...
dcb1bd08-374c-4...	dcb1bd08-374c-4db7-...
f7771a42-318e-4...	f7771a42-318e-4a30-9...
d15a056f-1420-4...	d15a056f-1420-4205-...
1494f77a-83ea-4...	1494f77a-83ea-4d05-...
2f8f5741-0479-40...	2f8f5741-0479-4057-9...

```
1  {
2      "originalMessage": "Time to go to bed",
3      "score": 0.7976418137550354,
4      "id": "f3ccb687-9b39-486f-8609-227cddbef46c",
5      "MessageArrivalTime": "2021-03-20T03:21:15.5065883Z",
6      "_rid": "uml+AKLvSwgHAAAAAAAAAA==",
7      "_self": "dbs/uml+AA==/colls/uml+AKLvSwg=/docs/uml+AKLvSwgHAAAAAAAAAA==/",
8      "_etag": "\"0800c031-0000-0100-0000-60556a2b0000\"",
9      "_attachments": "attachments/",
10     "_ts": 1616210475
11 }
```

13. If you are interested in creating some visualizations, then use your reporting tool of choice.
    I used Microsoft Power BI as it can connect to cosmos DB and show data in real-time. Please see
    the below dashboard for your reference.

Count of Sentiment Type by Sentiment Type

1.67K (16.42%)
4.24K (41.79%)

Sentiment Type
- Negative
- Neutral
- Positive

4.24K (41.79%)
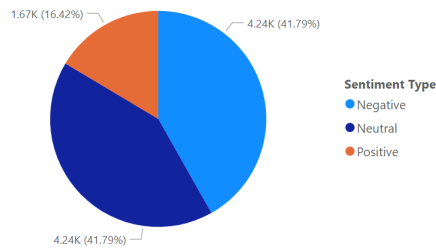
Count of Sentiment Type by Hour and Sentiment Type

Sentiment Type ● Negative ● Neutral ● Positive

Message	Sentiment Type	Sentiment Score	Message Arrival Time
Its nice weather outside	Neutral	0.50	3/21/2021 3:48:57 AM
USA is a country	Neutral	0.50	3/21/2021 3:48:57 AM
Time to go to bed	Neutral	0.80	3/21/2021 3:48:57 AM
Its fun doing this exercise!	Positive	0.94	3/21/2021 3:48:56 AM
I'm having fun with this exercise!	Positive	0.89	3/21/2021 3:48:56 AM
I like swimming	Positive	0.95	3/21/2021 3:48:56 AM

See PowerBI Dashboard File located HERE:

tf21serverless/SentimentanalysisPowerBIDashboard.zip at main · dabu-MTF21/tf21serverless (github.com)