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cs6650/assignment-03

https://github.com/thephilipquan/cs6650/tree/main/assignment-03

All following tables and pictures can be found in the repo under...
attachments
report

`design.v1`

In summary, my design flow and architecture is similar to assignment-02. My client spams requests to the server which interacts with an RDS, and returns a response.

Refer to the following for changes...

`client`

- Client request count has dropped from `1000 -> 100`.
- **Removed** `getAlbum(albumId)`.
- **Added** `postReaction(albumId)`.

`server`

- **Added** `/reviews/*` endpoint.
- `/reviews/*` POST handler publishes to RabbitMQ on another EC2 instance.

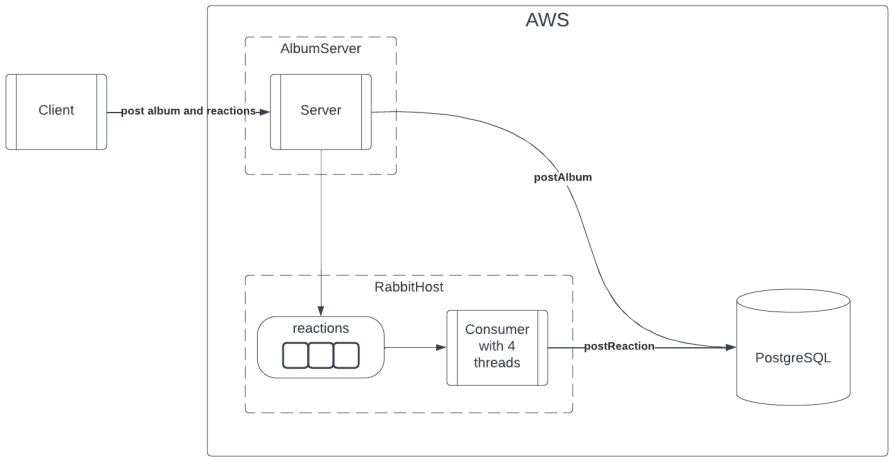
`database`

- Created table `reactions`.

`rabbithost (new)`

- Created a queue called `reactions`.
- Runs `consumer.jar` that spawns `x` threads to consume from `reactions` and `postReaction` to the RDS instance.

Below is the architecture as described.



And my updated schema...

```
CREATE SCHEMA IF NOT EXISTS album_app;
SET search_path TO album_app;

DROP TABLE IF EXISTS reactions;
DROP TABLE IF EXISTS albums;

CREATE TABLE albums(
>    albumId serial PRIMARY KEY,
>    artist varchar(255) NOT NULL,
>    title varchar(255) NOT NULL,
>    year integer NOT NULL,
>    image bytea NOT NULL
);

CREATE TABLE reactions(
>    albumId serial PRIMARY KEY REFERENCES albums (albumId) ON DELETE CASCADE,
>    likes integer DEFAULT 0 CHECK (likes > -1),
>    dislikes integer DEFAULT 0 CHECK (dislikes > -1)
);
```

You can find all pictures used in attachments.

The next page continues with design.v1.results.

`design.v1.results`

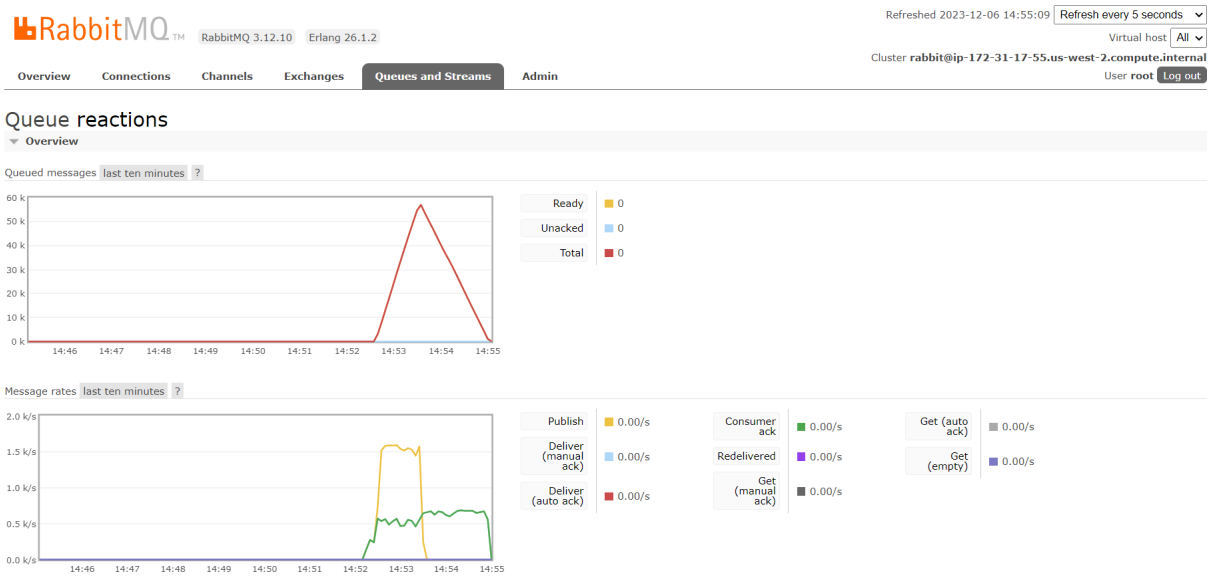
My throughput for assignment-02 assignment was around `2400/s` (see assignment-02 report).

	walltime	throughput
groupSize=10	28.155 s	1563 r/s
groupSize=20	46.765 s	1796 r/s
groupSize=30	62.932 s	1970 r/s

s = seconds
r/s = requests per second

You can **view the file output for more details** at https://github.com/thephilipquan/cs6650/tree/main/assignment-03/client/report.

`design.v1.queue.results`



As you can see, the consumption rate was about ⅓ of the publish rate. Naturally, I decided to increase the threads to something like `20`, but there was no change in the performance.

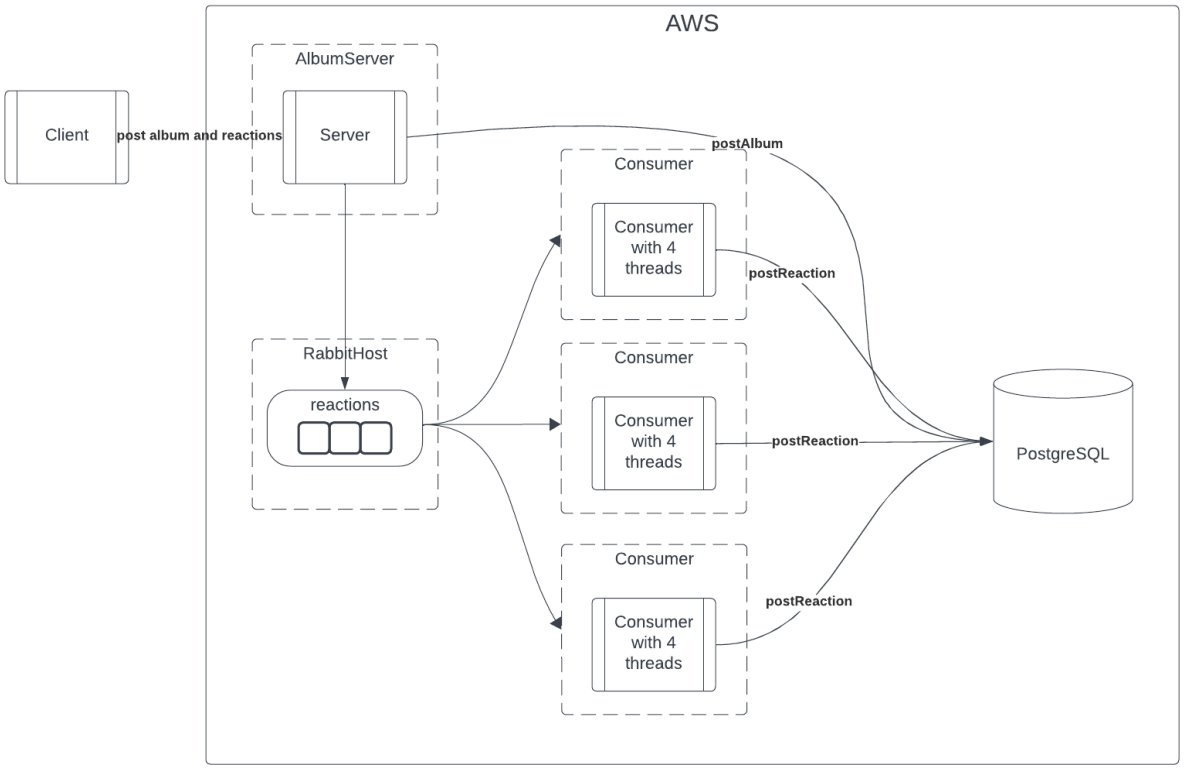
That's how I ended up with **design.v2**.

`design.v2`

I didn't know if the RabbitMQ service or the consumer threads were more taxing, and I didn't want to spend a lot of time testing every adjustment to find the perfect configuration.

Instead, I created 3 EC2 instances that each spawned 4 threads to consume from the queue that was hosted on another instance.

Refer below.



And with no other changes to the code, I received the results on the next page.

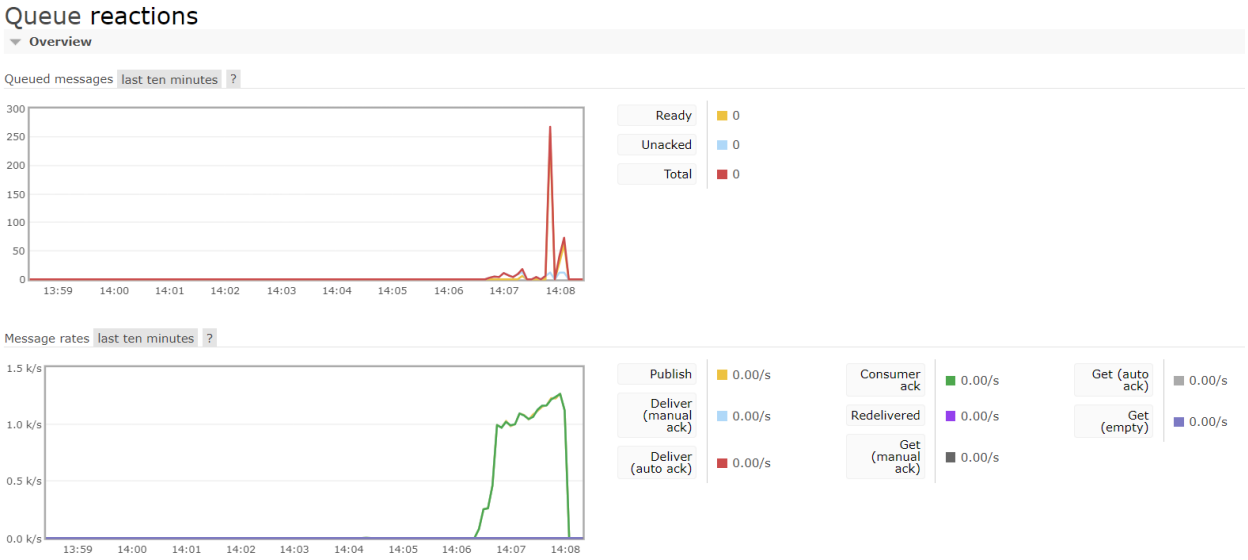
`design.v2.results`

The client side results are nearly unchanged, as it should be since design.v2 changes target the queue consumption rate.

	walltime	throughput
threadCount = 10	27.56 s	1597 r/s
threadCount = 20	46.55 s	1805 r/s
threadCount = 30	64.876 s	1911 r/s

s = seconds
r/s = requests per second

`design.v2.queue.results`



As you can, the total queued messages caps out at just under `300`, a drastic decrease from [design.v1.queue.results](#) `60,000`.

But more importantly, **the publish and consume rate is nearly the same** throughout the lifetime of the program.

And to top it off (I don't have proof), the consumers finished just as the client finished.