Bahrain Airport Company is revolutionizing the Airports Resource Allocation by using predictions calculated using an Event-Driven Architecture (Takhatta)

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The virtual queueing system enables BAC to measure the overall success of the system while enabling passengers to enjoy airport facilities, making it vital for the success of Takhatta.

Introduction

BAC (Bahrain Airport Company) is looking to remove the unnecessary cost of having too many check-in employees on duty as well as not having enough employees to handle high passenger traffic.

Staff managers want to create a monthly schedule for employees depending on the departing flights.

BAC aims to increase passenger satisfaction prior to the check-in process and enable passengers to enjoy the airport facilities without stressing about the queue.

Objectives

Business objectives:
- Effective allocation of resources
- Reduce passenger queue time
- Increase passenger satisfaction (80-90%)

client requirements:
- Suitable assignment of check-in employees
- Three-minute queue time
- Record passenger feedback

Features:
- Virtual queueing system
- Simulation-based predictions
- Manager/check-in employee/passenger dashboards
- Visual representation of predictions/metrics

Technologies

AWS Lambda – Handle backend functionality

AWS DynamoDB – NoSQL database to store data

AWS SNS Send email/SMS notifications

AWS SQS – Handle queueing using FIFO

AWS S3 – Static hosting of webpages

AWS Cognito – User authentication

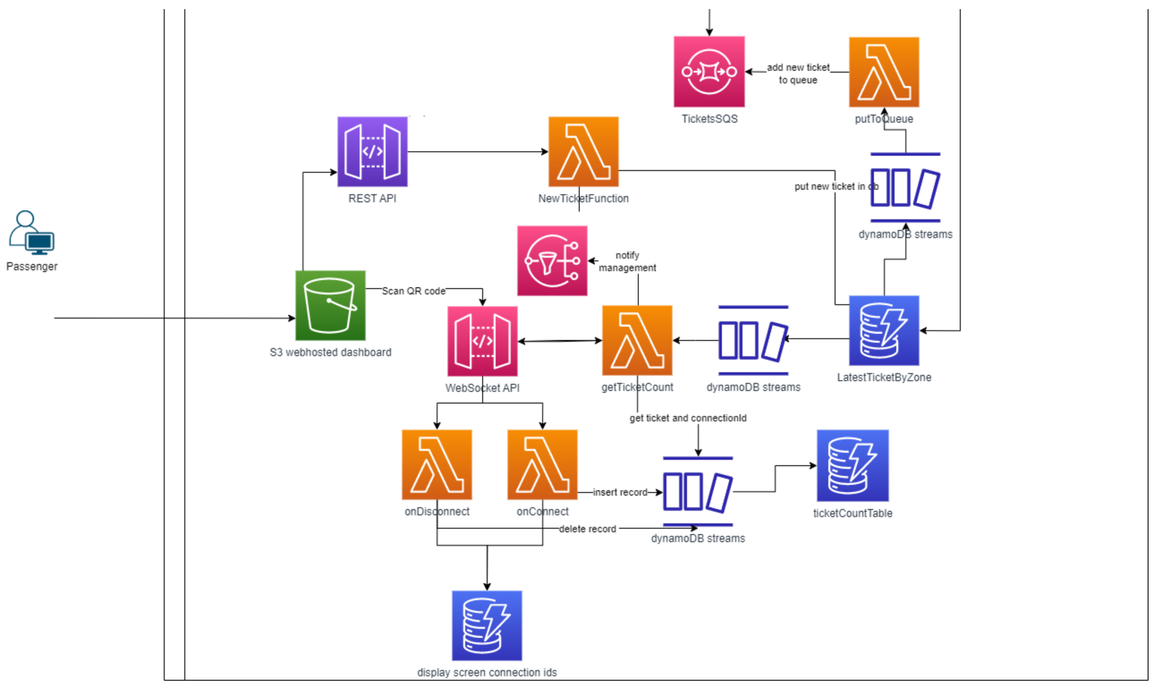
API Gateway– Rest and WebSocket APIs to connect frontend to backend

AWS IAM – Handle service permissions

Draw.io– Design system architecture

Design – virtual queueing system

Virtual queue subsystem architecture:
- Places passenger in SQS (queue)
- Records actual wait time for each passenger
- Sends data to three databases
- Notifies management on high passenger traffic
- Redirects to satisfaction survey



Employability skills

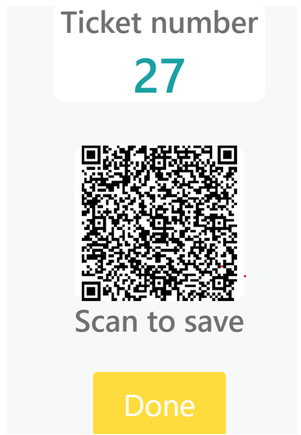
Planning & organizing:

The project was very challenging as I wasn't familiar with the AWS services and don't have sufficient experience with python. To overcome these challenges, I
- Dedicated 25 hours a week to familiarize myself with the console/python
- Regularly asked for feedback from peers/consultant
- Created and stuck to a schedule for all subtasks
- Consistently communicated with team members

Implementation – virtual queueing system

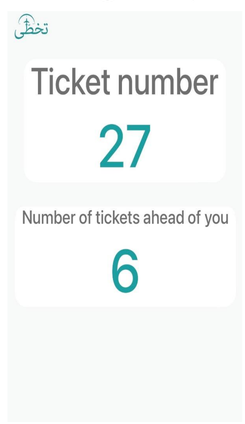
On-premise tablet:

Home screen

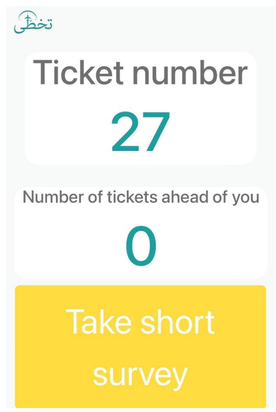


Ticket display screen – Dynamically generated QR code for each ticket

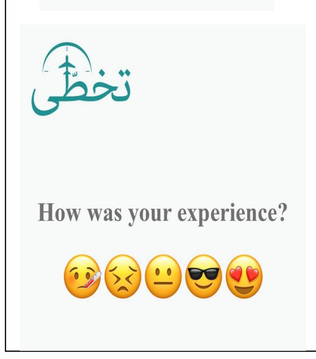
Passenger's personal device:



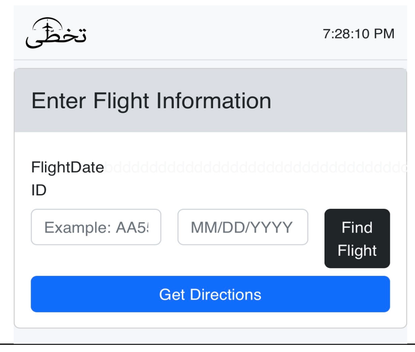
Ticket number display on passenger device



Ticket display – survey button when count of tickets is 0



Short survey



Passenger flight lookup

Conclusion

After thorough testing and meeting with the client for their feedback, the system achieves all the success metrics and all the functional and non-functional requirements have been met.

Future work:
- Encrypt URL parameters
- Increase idle timeout limit