COVID-19 Airport Operations Database

INFO 6210 - Data Management and Database Design

Submitted To

Prof Simon Wuping Wang

Submitted By

Anudeep Sri Bathina

Apeksha Khandelwal

Alekhya Kadiri

Tulasi Kishore Reddy Chavali

Mayuri Vijay Nijai

Shalini Siddabathula

Table of Contents

Introduction

The main purpose of this document is to list the requirements of the Covid19 Airport Operation System project. This document also helps us to collect and analyze the ideas gathered for the project. This document will be subject to change, if more requirements are added to the project. This document is mainly prepared to set stage for the design phase of the project. The document being prepared is the first version of vision document for the Covid19 Airport Operation System project.

Database Purpose

The purpose of the database is to maintain and track the data of passengers, flights and on-ground staff amidst the pandemic. It will be used by administrative staff to make sure the operations in the airport are safe for the business and it will not duplicate the information from the airline database.

Addressed Business Problems

Airlines are operating with a lot of difficulty in the current pandemic. It's not only causing inconvenience for customers but also for the staff and admin department working in airport to adhere to all the guidelines for safety and maintain records for the same. Thus this database is created to help the operational department in maintaining records and hence working efficiently and smoothly.

- Preserves previous travel records for passenger.
- Keep track of the symptoms and covid19 results for each passenger/employee working in the flight before and after the travel.
- Maintain a record of all the Quarantine centers (ex: If a customer is travelling to Boston airport than he will be given suggestions for nearby centers)..
- Ensures what all and when the sanitization steps were taken by the flights before starting the journey.
- Allows the tracking of the infected traveler and all the people travelling with him/her to intimate them about the situation.
- Safeguards that all the passengers and employees travelling are tested covid19 negative and are equipped with all the precautionary items (ex: masks, sanitizer, gloves, etc.).

Business Rules

Following are the business rules followed while storing any records for customer, staff and flights:

1. Passenger
   - Each participant is required to submit one valid permanent address.
   - Only one phone number has to be entered where passenger wishes to receive updates for their flight.
   - For every passenger only the latest health and precautionary records will be stored.
   - Each passenger may have zero or more travel record/s.
   - Every passenger has to provide one type of food preference (As Yes or No).
2. Employee/Flight Staff
   - Each staff member is required to submit one valid permanent address and one phone number.
   - Every employee's latest health and precautionary records will be stored.
   - Employees may travel in zero or more flight/s in a day.
3. Flights
   - Each flight has to go through one or more mandatory sanitization process/s before taking-off.
   - Every flight will have one status (ex: delayed, arrived, on-time, etc.).
   - Every flight will go through one mandatory security check.
4. Quarantine Centers
   - One or more quarantine centers can be located near a destination airport.

Design Requirement

- Use Crow's Foot Notation.
- Specify the primary key fields in each table by specifying PK beside the attribute(s).
- Specify the foreign key fields in each table by specifying FK beside the attribute(s).
- Draw a line between the fields of each table to show the relationships between each table. This line should be pointed directly to the fields in each table that are used to form the relationship.
- Specify which table is on the one side of the relationship by placing a one next to the fields where the line starts.
- Specify which table is one the many side of the relationship by placing crow's feet symbol next to the field where the line ends.

Entity Description

Entry List and their PKs & FKs

SN	Table	Primary Key	Foreign Key	
			ColumnName	**Reference (ReferencedTable.ReferredAttribute)**
1	Passenger	PassengerID	AddressID	Address.AddressID
			PrecautionID	Precaution.PrecautionID
2	HealthPreTravel	PreTravelID	TravellerID	Passenger.PassengerID OR Employee.EmployeeID
			CovidTestID	Covid.CovidTestID
3	HealthPostTravel	PreTravelID	TravellerID	Passenger.PassengerID OR Employee.EmployeeID
			CovidTestID	Covid.CovidTestID
4	Covid	CovidTestID		
5	Precaution	PrecautionID		
6	Employee	EmployeeID	AdrdessID	Address.AddressID
			PrecautionID	Pecaution.PrecautionID
7	StaffOnFlight	EmployeeID	EmployeeID	Employee.EmployeeID
		FlightID	FlightID	Flight.FlightID
8	Address	AdrdessID	CountryCode	Country.CountryCode
9	PassengerTravelHistory	TravelID	PassengerID	Passenger.PassengerID
			DestinationIata	IataCode.IATACode

10	QuarantineCenter	CenterID	AddressID	Address.AddressID
			DestinationIata	IataCode.IATACode
11	Country	CountryCode		
12	PassengerOnFlight	PassengerID	PassengerID	Passenger.PassengerID
			FlightID	FlightInformation.FlightID
		RouteID	RouteID	Route.RouteID
			FoodID	FlightFood.FoodID
13	FlightPrecaution	FlightPrecautionID	FlightID	FlightInformation.FlightID
14	IATA Codes	IATAcode	CountryCode	Country.CountryCode
15	FlightFood	FoodID		
16	Route	RouteID	SourceIata	IataCode.IATACode
			DestinationIata	IataCode.IATACode
17	Flight_Information	FlightID	RouteID	Route.RouteID
			FlightStatusID	FlightStatus.FlightStatusID
18	FlightOperations	FlightOperationID	FlightID	FlightInformation.FlightID
19	Flight Status	FlightStatusID		

Description

Entity	Importance	Connection
Passenger	This is one of the primary entity which stores personal information about passengers who wish to travel in this pandemic. This information will contain their name, phone no, email address, age and gender. The email and phone number can be used to update the passenger about the flight or co-passenger.	As one of core entity, the primary key, PassengerID, will connect it to passenger's pre, post health data and their travel history records. The address for each passenger can be fetched using the AddressID which connects it with the Address entity. The precaution ID can be used to refer to the Precaution table to check if passenger is equipped with all the required items listed in that table.
HealthPreTravel	Information about any traveler's health before starting the journey is stored in this entity. Data like current temperature while boarding the flight and any critical illness traveler is prone to can also be deduced from this entity.	Passenger and Employee entities are referred here to connect individuals data with their unique IDs. The Covid entity will be referred to store covid related data for any traveler.
HealthPostTravel	This entity can be used to maintain the health record of passengers after they complete their journey. Team intends to store data for each passenger for a particular time limit and later delete it.	The entity is directly connected with Employee, Passenger and Covid entity which willhelps in finding the traveller's post travel medical conditions and test results.
Covid	The entity will provide the date and result for latest covid test taken along with the symptoms (if any) for every individual.	
Precaution	This entity is created to keep a check on every traveler (Employee/passenger) if they are equipped with all the necessary precautionary items or not. The entity acts like a checklist. **NOTE**: **All the attributes will be of Boolean datatype.**	

Employee	Another major purpose of this database is to retain data on employees. This entity will store employee's personal information like name, phone no, email age and gender. Team intends to track and update employees in the similar fashion that is followed for passenger.	Every Employee tuple will be connected to their pre, post health data. The address for each member is stored in Address entity and can be retrieved using AddressID. The precaution ID will link the precautionary checklist for each employee. The entity is directly related to FlightInformation entity through an associative entity due to many-to-many relationship.
StaffOnFlight	This is an associative entity which stores the record for each flight and employee travelling in it. This entity is useful while tracing the list of employees assigned to serve any flight.	The entity directly refers to FlightInformation entity to get FlightID and to Employee entity to fetch the employee details.
Address	The entity will be used to store the complete address details (StreetName, City, State, zipcode, CountryCode) for any individual.	The direct connection to CountryCode will provide country related information from Country entity.
PassengerTravelHistory	Capturing data on previous travels for every passenger is the agenda for this entity. It will include the date of travel and return for every passenger. This data can be used to calculate the chances of any traveler being contaminated with covid virus.	The entity will refer to IataCode entity to identify the travel destination for each passenger and passengerID will connect this data with passenger entity.
QuarantineCenter	Team plans to store data on quarantine centers so that in case of emergency a list of nearby centers can be generated for the traveler. This entity will maintain the name of contact person who can be reached to using the provided phone number and the number of beds available.	The direct connection to Address table can be used to fetch the center's address and the relation with the IataCode be connect the tuple with destination airport.

Country	The entity will be used to store the country code and their respective country names.	
PassengerOnFlight	This associative entity is created with the intention to hold information on all the passengers travelling on a flight from a route along with their food preference, date of travel, allotted seat details and information if any special assistance is required.	The entity refers Passenger, FlightInformation, Route, FlightFood entities to fetch the required information to connect all these entities and eliminate many-to-many relationship. Multiple travelers can be flying in a flight which is takes one of many routes.
FlightPrecaution	This entity will hold information of flight and their sanitization and precautionary measures including the previous date of travel, people who were found affected, sanitization date and if any medication is there in the flight.	The entity directly connects the collected data for precautions taken by fight with FlightID from FlightInformation entity.
IataCode	IATA code is a unique code given to airports for identification (like zipcode). This entity will help user to fetch airport and country name using IATA code.	It will refer to Country entity to fetch country details.
FlightFood	The entity will store information on food preference, babyFood, allergies or beverage requirement for any individual. NOTE: **All the attributes will be stored in Boolean if they have any preference**	
Route	Route entity is created to store details about flight and its source and destination for every journey.	For storing the source and destination codes the entity makes a direct reference to IataCode entity.

FlightInformation	This is another primary entity which will store information about flights. The entity will hold data on the company of airplane, departure & arrival time and the maximum number of people permitted in the flight in current situation due to covid.	The connection to Route entity can be used to gather route related information for a particular scheduled flight and Flight Status entity to check the current status for the flight.
FlightOperation	The FlightOperation entity will store information about the flight related operations like security check and custom clearance for each flight scheduled.	The entity will refer FlightInformation entity to connect this data with its respective Flight.
FlightStatus	This entity will store the information about status (eg: arrived, delayed, on-time, cancelled) that can be fetched using statusID.	

Reference

1. ERD: https://app.lucidchart.com/invitations/accept/1503108b-7f99-4182-b2a0-c7aca1320bf0
2. Example Design Document shared on BlackBoard.