

Data Structures

User Data Structure

```
public class user {  
    public long UserID { get; set; }  
    public string Name { get; set; }  
    public string Email { get; set; }  
    public string PhoneNumber { get; set; }  
    public ICollection<Alert> Alerts { get; set; }  
}
```

Alert Data Structure

```
public class Alert {  
    public long Id { get; set; }  
    public string DepartureAirPort { get; set; }  
    public string DestinationAirPort { get; set; }  
    public DateTime TravelDate { get; set; }  
    public decimal TargetPrice { get; set; }  
    public Currency PriceCurrency { get; set; }  
    public int UserId { get; set; }  
}
```

//For response to users the flight details (not implemented in the code)

```
public class Flight {  
    int FlightNumber {get;set;}  
    DateTime DepartureTime {get;set;}  
    DateTime ArrivalTime {get;set;}  
    double price {get;set;}  
    public Currency PriceCurrency { get; set; }  
    string DepartureAirPort {get;set;}  
    string ArrivalAirPort {get;set;}  
}
```

Data Flow

1. Price Data Reception:

- External sources send flight price data to the Processing flight prices service.
- The flight prices service validates and normalizes data.
- send event data to the User Alert management service

2. Processing flight service:

Receives incoming price data and validates/normalizes the information.

3. Alert Management (CRUD):

- Users interact with the **Alert Management Service** via mobile or web client.
- They can create, update, delete, and view alerts.
- All CRUD operations update the Database (storing user alerts and associated information).
- Create the relevant event alert according the user's information and their alert data stored in the database and send it to queue.

4.Event Generation & Queuing:

- receiving price data event as producer from Alert Management.
- the event is placed on the **Event Queue**.

5. Notification:

- The **Notification Service** listens to the Event Queue.
- It fetches the corresponding user's device token from the Database and forwards the push notification to the Mobile Push Gateway.
- The Mobile API Gateway forwards the push notifications to mobile devices.