
Architecture & Design, B.Tech(CSE) - SD
Deptt.,MMEC, MMDU

Flight Reservation System
Software Architecture Document

Version 1.00

Revision History

Date	Version	Description
02/24/2020	1.00	Introduction. Goal, Constraints, Architectural Views are described for the Flight Management System.

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Flight Reservation System (FRS)

1. Introduction

Flight reservation system is also called as passenger service system (PSS) through which we can directly contact with the passenger. Computer reservation system (CRS) is used for the reservations of a particular airline and interfaces with a global distribution system (GDS) which supports travel agencies and other distribution channels in making reservations for most major airlines in a single system.

1.1 Purpose

The purpose of the flight reservation system is:

- 24/7 booking available for customers
- Increase accuracy of the system
- It will cut down operational costs
- Business can be motivated by owners from anywhere
- User friendly interface will be there
- Customer can select package according to his/her demands
- Different payment modes and multiple payment gateways for a safe and secure transaction
- Increase the number of loyal customers
- Provide security to the customer database
- It will save papers and printing expenses
- We will be able to see the status on seats available
- Easy cancellation process
- Easy refunds after cancellation
- Promote last minute offers to maximize bookings
- Easy and flexible booking policies for travellers
- Display Terms and Conditions, details and flights to the travellers
- Traveller can compare the prices
- Display the arrangement of seats on the screen thus enabling customers to book seats accordingly
- An easy system of referral. Each client is given a referral code
- Provides customer history with just one click

1.2 Scope

It is one of the modifications of the system, for the passenger service so that the working and availability of service area can be increased. It is an interface of world to carry out reservation on the desired airline from any place. It makes the life of a passenger very easy, they don't need to stand in the queues for getting their seats reserved and they can easily reserve any flight from a single system.

Basically with the help of this system, we can view different flights availability with different timings for a particular date, we can reserve a seat and cancel a seat, we can also modify it. It additionally shows data that how many passengers are going to load up a specific flight .

We can follow similar advances regardless of what is their method of framework get to is, in particular, telephone, web or the data work area at any piece of the world, keeping consistency in the framework. It makes the life of the airline service easier by keeping all the records of the passenger and if there is any change in the flight due to some reason, the passengers are punctually informed. The regular passenger can get can special offers and discounts. This system guides various travelers.

For a user this system is very easy to use and understand, in this no technical knowledge is required to use this system. The things that is required that we need to create an account in which we have to fill our all details. We can also reschedule our bookings.

Flight reservation system has removed a lot of burden from the customers as well as from the department of the airline management.

1.3 Definitions, Acronyms, and Abbreviations

- ***Flight reservation system:*** Basically it is for the passenger so that they can comfortably do their booking and it is easily for the staff to handle it through a single portal.
 1. PSS (Passenger Service System)
 2. CRS (Computer Reservation System)
 3. Global distribution system (GDS)

1.4 References

1. https://sceweb.uhcl.edu/helm/RationalUnifiedProcess/examples/csports/ex_sad.htm
2. https://en.wikipedia.org/wiki/Flight_management_system
3. <https://www.flightliteracy.com/flight-management-systems-fms-2/>

1.5 Overview

It basically deals with the passenger reservations and ticket records. An airline's direct distribution works within their own reservation system, as well as pushing out information to the GDS. The second type of direct distribution channel are consumers who use the internet or mobile applications to make their own reservations.

2. Architectural Goals and Constraints

The business scenario (Register Profile) is as follows:

- The customer should register himself in order to proceed to book ticket service.
- The customer needs to input all the required particular details during the registration process.
- The web service will perform validation checks on customer input and length constraints.
- Upon successful login, the customer will be registered officially to the web service and he can login using his username and password.
- The guest is only permitted to check flight availability.

The business scenario (Update Profile) is as follows:

- The customer should login by himself in order to perform update profile process.
- The customer will only change those fields that need to be updated.
- Then, any changes will be updated respectively.

The business scenario (Check Flight) is as follows:

- The customer is permitted to search available flights based on the origin city, destination city, departure date and return date.
- The web service will display any matching records based on the search criteria entered.
- The web service will notify the customer about the flight availability.
- If the searched flights are available, then web service will display flights which are within a week.

Otherwise, the web service will prompt to ask the user to re-enter new searching criteria.

The business scenario (Book Ticket) is as follows:

- From the Check Flight, the customer is required to log in and the web service will prompt the customer to confirm the flights.
- The web service will then ask the customer whether to update his profile details or not.
- Subsequently, the customer will be asked to purchase and confirm the selected flights.

The business scenario (Cancel Ticket) is as follows:

- The customer is required to be logged in before he has privilege to cancel his confirmed tickets.
- The customer will select which ticket to be cancelled in the booking history.
- Once the confirmed ticket has been selected then the web service will delete the data off from the database.
- The customer is given cancellation ID upon successful transaction.

The business scenario (View Booking Status) is as follows:

- The customer is required to be logged in before he has privilege to cancel his confirmed tickets.
- The customer will select details in the booking history to view booking status.

The business scenario (Pay Ticket) is as follows:

- After Book Ticket, the web service will generate payment ID upon successful transaction is made.
- Once it has been confirmed, the web service will generate booking id to the customer and require the customer to print out the mini itinerary receipt.

Architectural Constraints

- Only few bookings could be made due to manual operation.
- It takes enormous amount of time for recording transactions.
- Requires a large amount of manual laborers. Customers should go to ticket offices to reserve a ticket and cancel it

3. Architectural Representation

This section details the architecture using the views defined in the 4+1 model. These views are used to document the Flight management system. The views are:

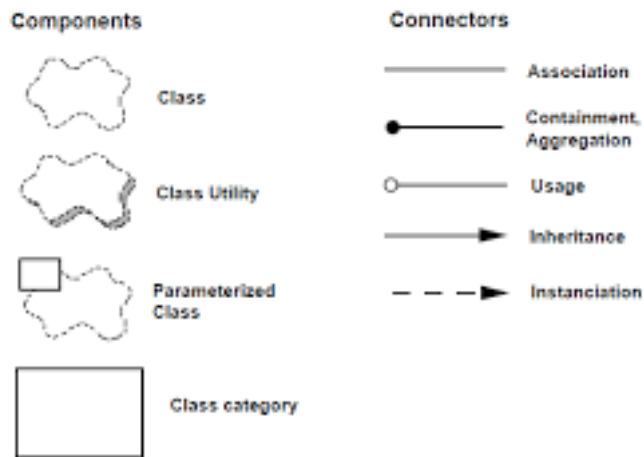
1. Logical view
2. Process view
3. Physical view
4. Development view
5. Scenarios

3.1 Architectural Views

1. Logical View:

It basically contains the information about various part of the system. In this we use sequence diagrams. In this view the end users are the **Stakeholders**. The main consideration of this view is defining the functional requirements.

For logical view we use these components:










Notation for the logical blueprint

2. Process View:

Here the end users are **Integrators** and **Programmers**. The main consideration of this view is it describes the performance, scalability and also the throughput.

For process view we use these components:

Sr. No	Name	Symbol
1.	Start Node	
2.	Action State	
3.	Control Flow	
4.	Decision Node	
5.	Fork	
6.	Join	
7.	End State	

3. Physical View:

In this view the Stakeholders is the **system engineer** who maintains the system. It also describes physical deployment of the system. In this view it is mainly considered about the Non functional attributes which means the requirements that specifies a particular criteria which can be used to judge an operation of the system in particular conditions.

The basic Nonfunctional Attributes are:

1. Performance: Response for a system to perform certain actions for a period of time. With in performance we are having to ways to measure it they are latency and channel capacity.
2. Reliability: It means we can assure that the system is not going to crash and also it will support us if we are working overtime on it.
3. Availability: It is all about the system availability which means how much time it is going to support or how many users can use it at a time.
4. Scalability: It is all about how much load a system can handle with out reducing its performance. There are two ways to improve scalability they are Horizontal and vertical.

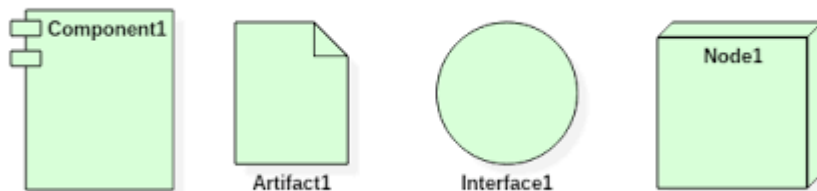
For the physical View we use Deployment Diagrams they are:

Node: It is a hardware components physical entities that are servers.

Artifacts: These are libraries, archives, databases, executable files, configuration files.

Communication Association: This shows the communication between two nodes in a single solid line.

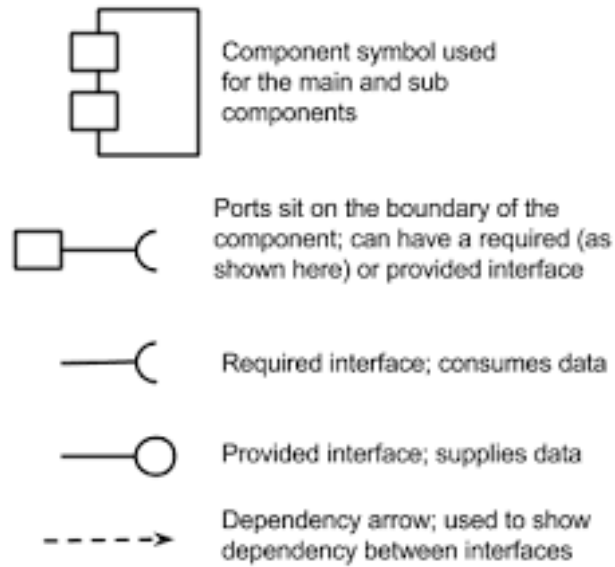
Dependency: It is the one node which is dependent on another.



4. Development View:

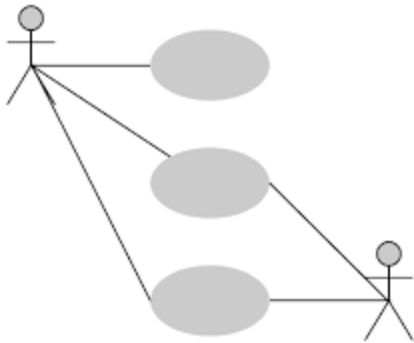
In this view the stakeholders are **programmers** or **code testers**. The main consideration of this view is the system describes the components of the system.

For development View we use these diagrams:



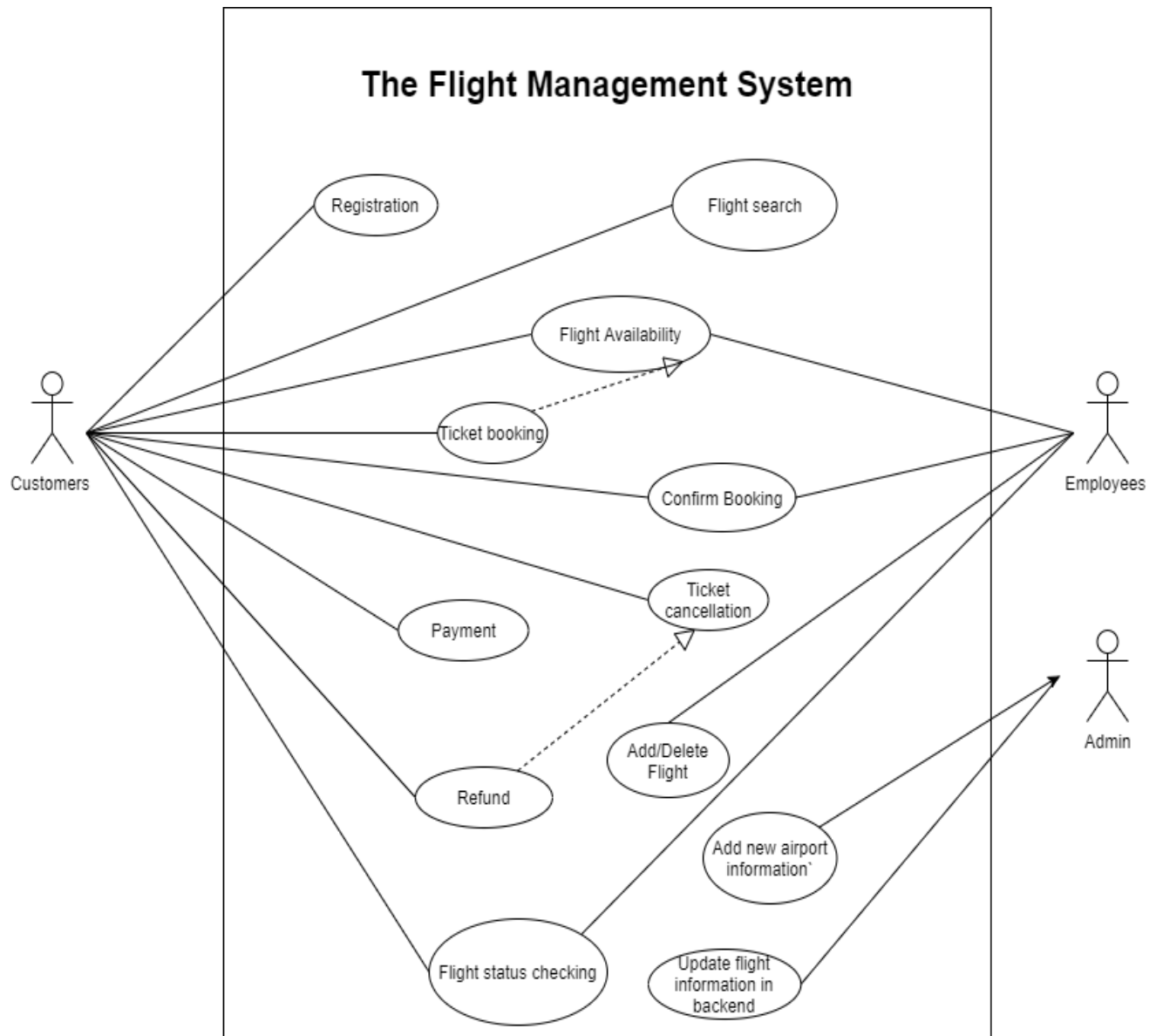
5. Scenarios:

In this view the stakeholders are **users** and **viewer**. The main consideration of this view is the functionality of the system is from the system as well as from the world. For Scenarios we use UML Diagrams:



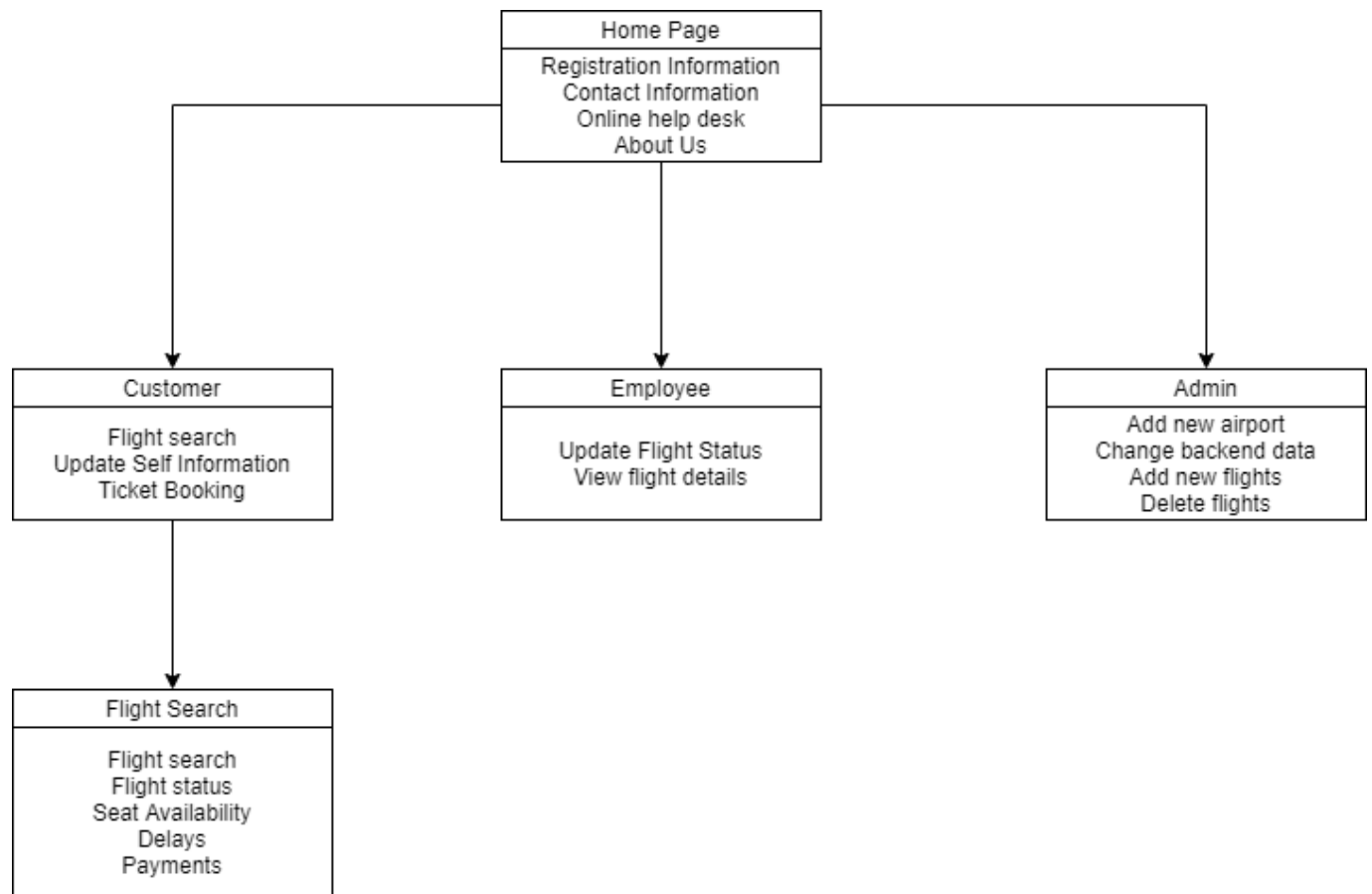
4. Architectural View Decomposition

4.1 Use-Case View



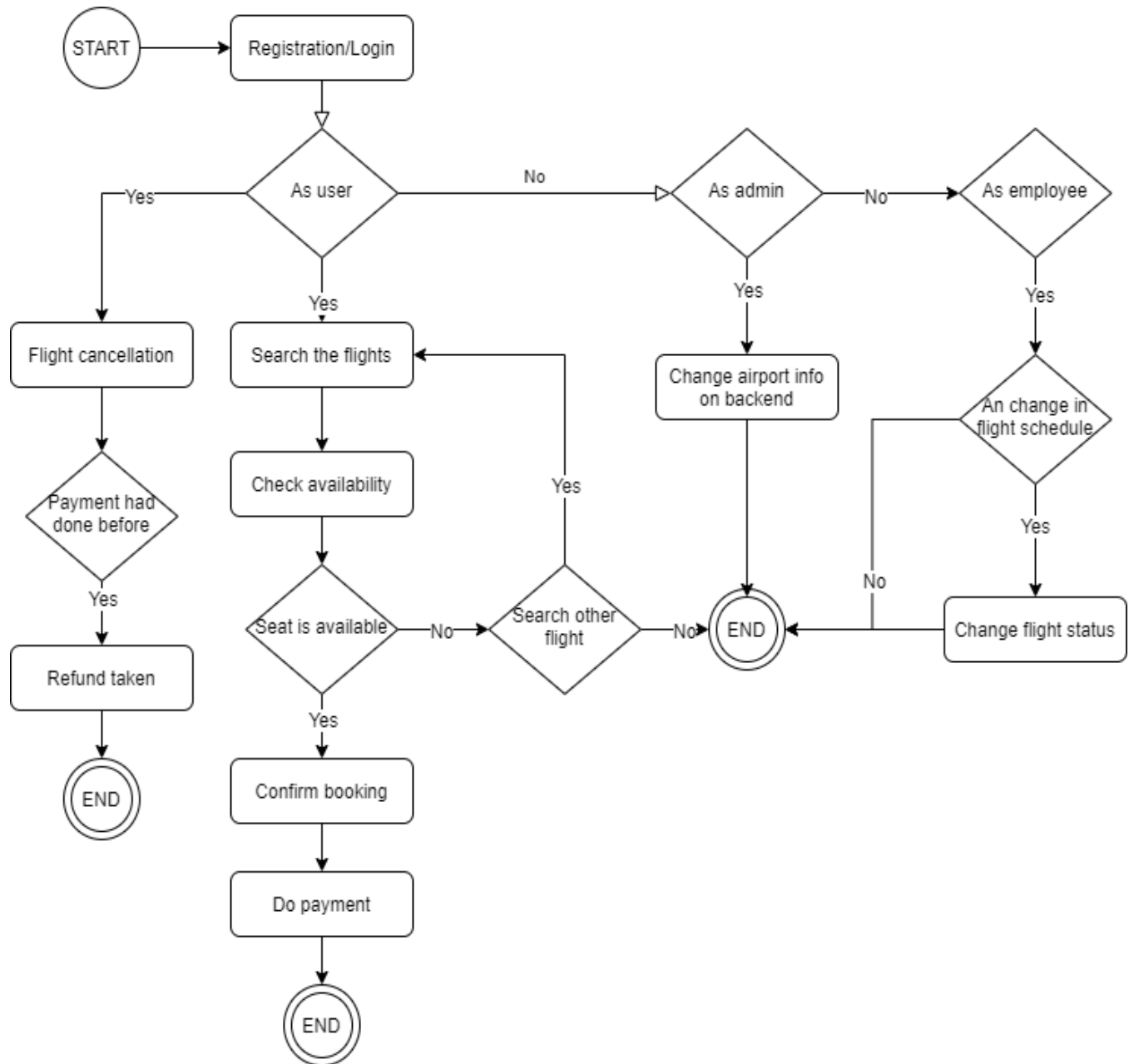
Use Case Model illustrates the system's intended functions (use cases), its surroundings (actors), and relationships between the use cases and actors (use case diagrams).

4.2 Design View



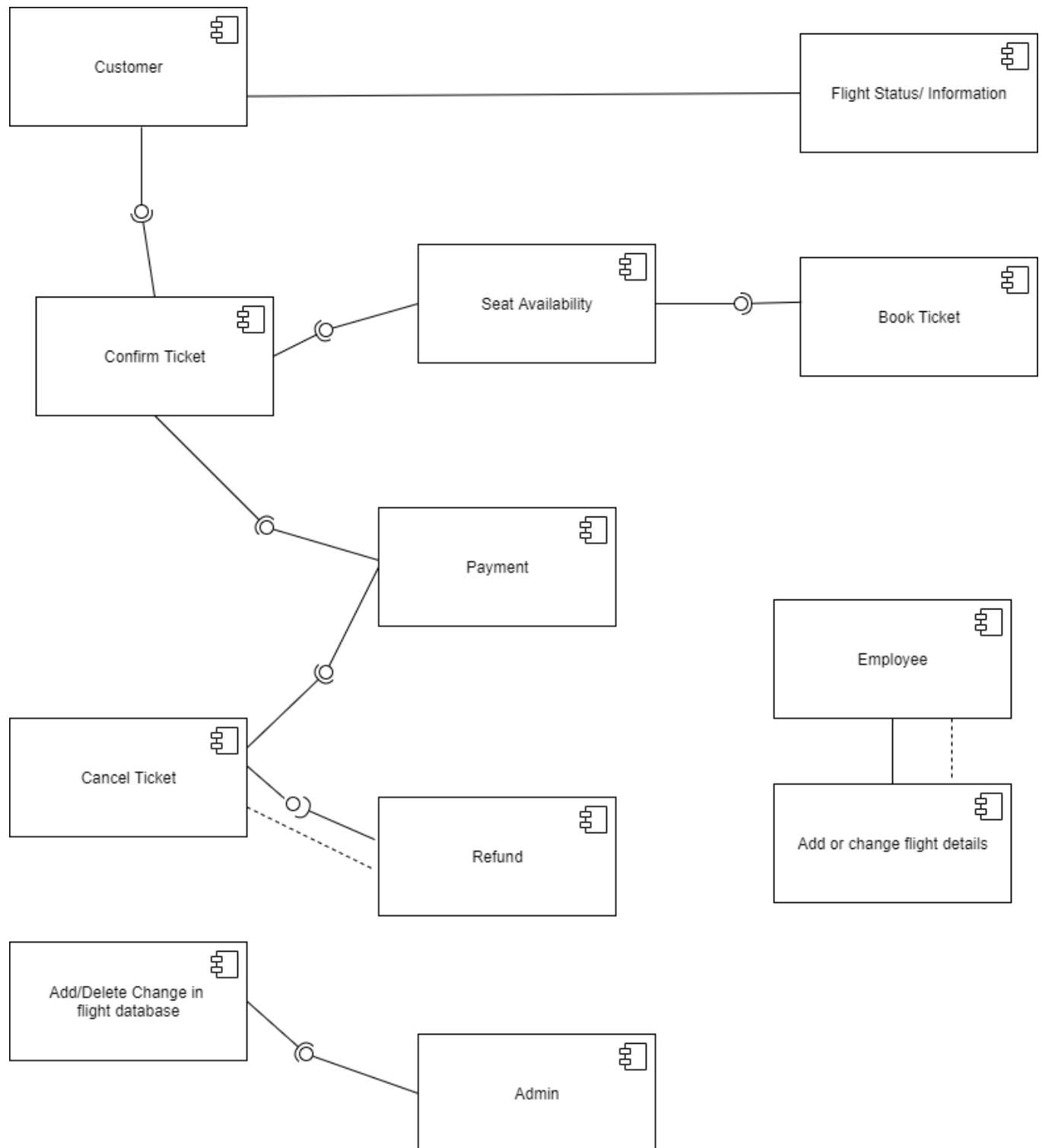
A class diagram in the Unified Modeling Language (UML) is a type of static structure diagram that describes the structure of a system by showing the system's classes, their attributes, operations (or methods), and the relationships among objects.

4.3 Process View



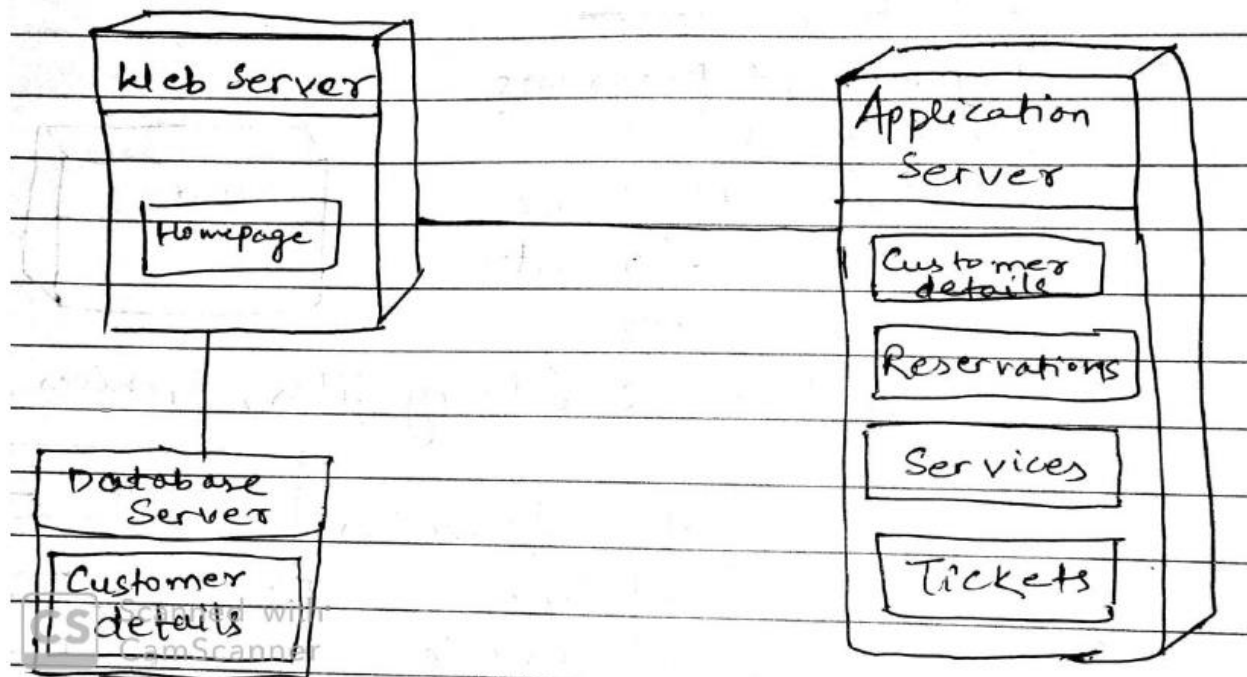
To provide a basis for understanding the process organization of the system, an architectural view called the process view is used in the Analysis & Design discipline.

4.4 Component View



A component diagram depicts how components are wired together to form larger components or software systems. They are used to illustrate the structure of arbitrarily complex systems.

4.5 Deployment View



Deployment diagrams are used to visualize the topology of the physical components of a system, where the software components are deployed.

5. Size and Performance

- The system will support many number of user against the central database at any given time.
- It will also support a number of users against the local server at any time.
- This system mainly supports two types of user privileges: Customer and Employee.
- Customer will have to access its own function and employee will have to access customer and flight functions.
- As the customer increases, the responsibilities for the same is also increases. Thus, the size and performance increases.
- There are different functions available for customer and employees.
- Customer have to make a new reservation for one-way, round-trip, multi-city.
- Customer also need to check date and time for the flight.
- Customer should also have the option for cancellation.
- Employee have also the same type of functions that needs to do like add or delete a flight, add a new airport, update for flights and other functions.
- The system needs to support to take reservations for many number of user at a

time.

- This system should also provide security to the customers.
- It should also provide a good database for the view of schedule, for the updates and for the feedback supports.

6. Quality

The Airline Reservation System (ARS) is a software application to assist an airline with transactions related to making ticket reservations, which includes blocking, reserving, cancelling and rescheduling tickets.

- Minimize repetitive work done by the system administrator and reservation clerks.
- Maintain consistency among different access modes, e.g. by phone, by web, at the information desk and across different physical locations. The users should be basically taken through the same steps by the system as they go through in conventional desk-reservation systems.
- Maintain customer information in case of emergency, e.g. flight cancellation due to inclement weather. The profile can also be used by the airline company to track user preferences and travel patterns to serve them better, plan routes, for better marketing and efficient scheduling of flights.
- Increase awareness among frequent travellers about various special offers and discounts.
- Minimize the number of vacant seats on a flight and maximize flight capacity utilization.
- Maintain the capability to adopt a flexible pricing policy. The price of the tickets should be dynamically determined based on how early, before the date of departure, the customer buys the ticket.
- Reduce effort and frustration for travellers in scheduling a trip, especially by reducing the search effort for the flight they need to take.

7. Bibliography

There are a number of links which is visited to take help from them. Managers are contacted to know the terms related to architecture and document. There are the following links which are visited:

1. <https://scholar.smu.edu/cgi/viewcontent.cgi?referer=https://www.google.co.in/&httpsredir=1&article=3079&context=jalc>
2. <http://people.cs.ksu.edu/~kaavya/References.pdf>
3. <https://www.encyclopedia.com/computing/news-wires-white-papers-and-books/airline-reservations>
4. <https://www.ukessays.com/essays/computer-science/software-requirements-of-a-airline-reservation-system-computer-science-essay.php>