

Dec 26, 2025

SE 4458 Software Architecture & Design of Modern Large Scale Systems - Final

Group 1 : Airline Ticketing System

Create an airline ticketing system like turkishairlines.com . Implement Below are use cases for functional and non-functional requirements.


ADD FLIGHTS

→ Login

Username

Password


LOGIN

 Flight Entry

From City

To City

Flight Date



Flight Code

Duration

Price

Capacity

SAVE

- Authenticated Admin users can add flights to specified dates with capacity. This will be entered from a separate domain like admin.airlines.com. Users who can use this screen will be in ADMIN role
- For price prediction, you will build a simple price prediction model using Machine Learning. You can use a dataset like <https://www.kaggle.com/datasets/shubhambathwal/flight-price-prediction> . This will predict the price of flight based on duration, time (and other attribute you wish based on dataset you work on)

SEARCH FLIGHTS

☒ Round trip ☐ One way

From

Izmir

Izmir Adnan ... (ADB)

To

Istanbul

Istanbul (All)

Departure

Saturday

11 May

...

Return

Sunday

12 May

Passengers

1 Passenger

ECO

Search flights →

Choose return date

☐ Flexible dates ☐ Direct flights

OK

<

May 2024

June 2024

>

Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa	Su
		1	2	3	4	5						1	2
6	7	8	9	10	11	12	3	4	5	6	7	8	9
13	14	15	16	17	18	19	10	11	12	13	14	15	16

Filter:

Direct / Connecting ▼

Airline ▼

21:35

ADB

Izmir

ESB

07:40

SAW

Istanbul

Itinerary details ▼

Flight duration 2h 25m Operated by: AJet

17:45

ADB

Izmir

ESB

23:25

SAW


Istanbul

Itinerary details ▼

Flight duration 2h 25m Operated by: AJet


- Users will be able to search by airport, dates and number of passengers
- Flexible dates and direct flight options should be available
-


BUY TICKET

**Miles&Smiles**

You can easily save passenger information by signing in to your Miles&Smiles account.

[Sign in to Miles&Smiles](#)

 **Passenger information** | Adult

 It is not possible to change the name and surname information after completing the reservation process.

☐ Mr.

☐ Ms.

First / Middle name (as shown on ID)

Surname (as shown on ID)

DD/MM/YYYY

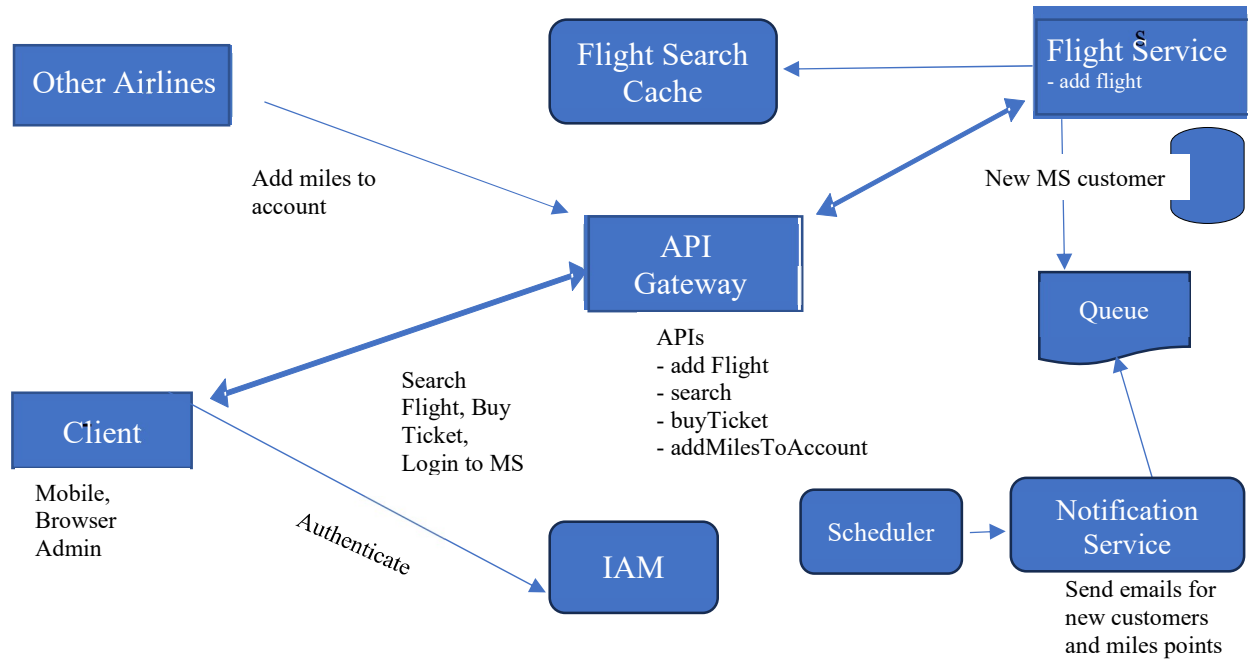
☐ Miles Smiles Uyesi Olmak Istiyorum

- When buying a ticket, capacity in the flight must be reduced as many as number of passengers
- If a passenger is a MilesSmiles member
 - o they can login and their information will be populated. Moreover, purchases will be saved with MilesSmiles member number
 - o they can buy the ticket with MilesSmiles points, if they have enough of them
- if passenger wants to be a MilesSmiles member
 - o create a profile and later send a welcome email
- NO transaction needed for payment

ADD MILES TO MILES&SMILES ACCOUNT

- once the flights of MilesSmiles customers end, a nightly process runs and updates points in member accounts
- other airlines that are in MilesSmiles program can also update miles points. THIS WILL BE AN AUTHENTICATED SERVICE
- write a scheduled task
 - o to go over flights and members on the run date and send emails if there are any points added to account balance
 - o to pull new customers from the queue and send them a welcome message
- For email send, you can use a gmail account. see <https://kinsta.com/blog/gmail-smtp-server/>

NON-FUNCTIONAL REQUIREMENTS



Students

DOGUKAN YESILKAYA	KAAN YILMAZ
IRMAK ARABACI	ULKU BARTU SERBEST
AYSIMA ADATEPE	ALI HAKTAN SIGIN
MELISA DEMIRBAS	BASAR OZKASLI
HUSEYIN BALCI	MELİSA ŞENER
KEREM KOYUNCU	LARA ÖZDUMAN
MELIKE AYTAC	DİLA GENÇAĞA
YAGMUR SABIRLI	CEMİL FAHRECİ
NURETTIN DEMIREL	

Group 2: Create a Hotel Booking System

Create a hotel booking system like Hotels.com. Implement Below are use cases for functional and non-functional requirements.

HOTEL ADMIN SERVICE

→ Login

Username

Password

LOGIN

Hotel Swiss

Logout

Baslangic

Bitis

Oda Tipi

Oda Adedi

Price

Predict

Status

☒ Dolu (Vacant) ☐ Bos (Occupied)

- Admins for hotels can add/update rooms for availability between start and end dates. This will be entered from a separate domain like admin.hotels.com. Users who can use this screen will be in ADMIN role
- For price prediction, you will build a simple price prediction model using Machine Learning. You can use a dataset like <https://www.kaggle.com/datasets/maelysboudier/hotel-prices-in-europe> . This will predict the price of hotel room based on time of the year, size (and other attribute you wish based on dataset you work on)

HOTEL SEARCH SERVICE

Hotels.com

Seyahat Ara

Baris

Nereye?

Varis noktası

Bodrum, Muğla, Türkiye


Tarihler

12 May - 16 May

Misafir sayısı

2 misafir, 1 oda


Ara




Haritada göster


300 veya daha fazla konaklama yeri
Konaklama yeri sıralamamızın işleyiş şekli ⓘ

Sıralama ölçütü:
Önerilen

 Giriş yaptığınızda binlerce otelde ortalama %15 oranında kazanç sağlıyorsunuz [Giriş yap](#)



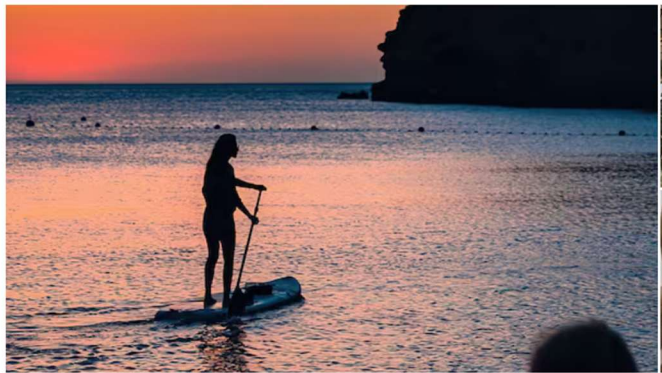
Hyde Bodrum - Yetişkin Oteli
Torba
Her şey dâhil Havuz
43.791 TL
4 gece için
Gecelik 10.948 TL
vergiler ve ücretler dâhildir
Puan toplayın
Olağanüstü 3 yorum
Ekstra kazanç için hesabınıza giriş yapın



MGallery The Bodrum Hotel Yalıkavak
Yalıkavak
Havuz
37.830 TL
4 gece için
Gecelik 9.458 TL
vergiler ve ücretler dâhildir
Puan toplayın
Olağanüstü 30 yorum

- User can search hotels by destination point, dates and number of people. Only rooms that admins specified as vacant will appear in results for given dates
- Client who login to application will see 10% discounted prices.
- 'Haritada goster' is required to show hotels that have been searched

BOOK HOTEL SERVICE



[Genel Bakış](#) [Otel Özellikleri](#) [Odalar](#) [Engellilere Yönelik Özellik](#) [Politika](#)

Hvde Bodrum - Yetiskin Oteli

Üye Fiyatı: %10 indirim

42.225 TL

~~46.917 TL~~

4 gece için
Gecelik 10.556 TL
vergiler ve ücretler dâhildir

[Fiyat bilgileri](#) >

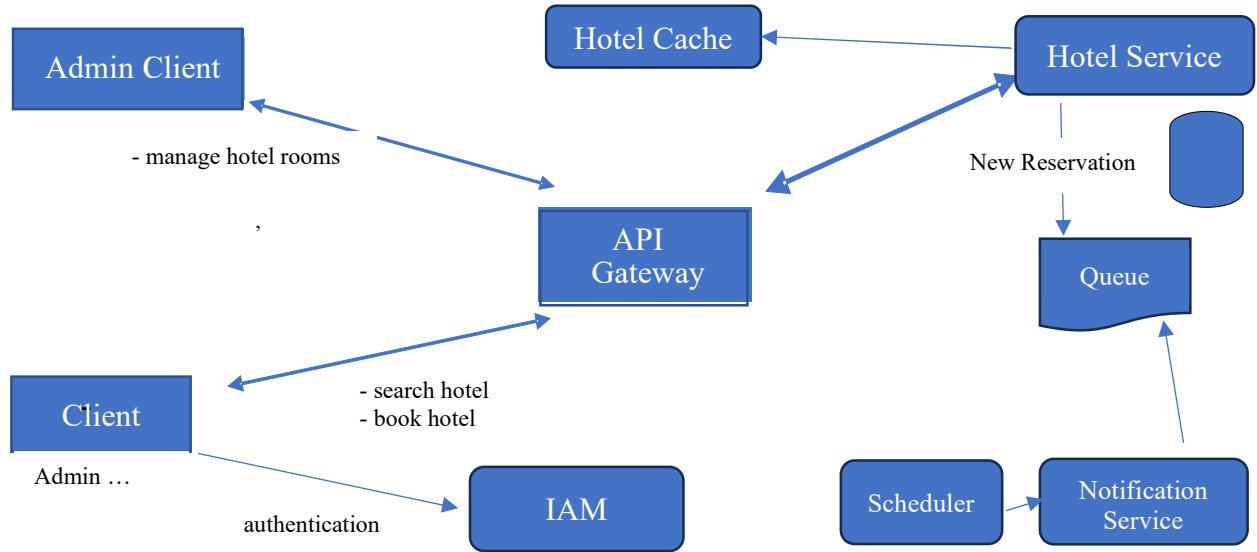
[Rezervasyon yap](#)

- On hotel detail page, user can book the hotel. Capacity of the hotel needs to be decreased for specified dates
- NO transaction needed for payment

NOTIFICATION SERVICE

- write a nightly scheduled task
 - o to go over all hotel capacities and notify hotel administrators when it is below 20% for the next month.
 - o to pull new hotel reservations from the queue and send them a message about reservation details

NON-FUNCTIONAL REQUIREMENTS



Students

ELİF EMİNE GÜNAL	OZAN BÖCE
BERKAY HEREK	MURAT HABİP OKAN
MEHMET UTKU	PELİN DUMAN
GÜNDOĞDU	SELÇUK SUAT SAYIN
EMRE ŞENER	DEFNE TEKYİĞİT
ESRA ECE GÜNGÜNEY	DURU GENÇAY
DİLARA ACAR	SUDE KARAKAYA
AHMET KEMAL BİLİCİLER	TEVFİK EFE AYDIN
	DENİZ YALIM YILMAZ

COMMON REQUIREMENTS

- Project can be built on any service-oriented framework as long as requirements are met.
- Simple UI implementation per mock-ups given above **is required**. Front end UIs do not have to be same as shown above. It just needs to work
- All business use cases above must be available via REST webservice
- The project will be deployed to providers like Azure, Google Cloud and AWS or any other cloud vendor. Deployment is BONUS (+20 points)
- Per deployment diagrams above, Flight, Hotel and Notification services will be deployed separately. All APIs will be reached via an API gateway
- All user authentication will be stored in an IAM service like AWS Cognito. No external authentication like Google needed. Your local authentication implementation will not be accepted
- You can use RabbitMQ, AWS SQS or Azure Messaging for queue solutions. If you can't implement it, you will need to implement it synchronously but you will lose points
- For caching, you can use a distributed cache like REDIS or memory cache
- All REST services must be versionable and support pagination when needed
- You can choose any development environment you like as long as they support REST services and is deployable in cloud.
- You can make assumptions as long as you document them
- At least one caching solution needs to be implemented i.e Airport names , Airline destinations
- MAKE SURE TO CREATE A DOCKER FILE in your source. See an example at <https://www.digitalocean.com/community/tutorials/how-to-build-a-node-js-application-with-docker-for-a-node.js> application. DO NOT CREATE A DOCKER IMAGE FILE, it would be too big and not needed
- DEPLOYMENT
 - o create a data model for each data source and use a DATABASE service from any cloud service you like i.e Azure SQL Server, Azure Cosmos Table. SQLite is NOT allowed
 - o For API and UI layer hosting of app services, use a cloud service i.e Azure App Services, AWS App runner
 - o For API gateway, you can use the gateway you implemented in assignment. AWS API gateway is free. Azure API management is costly so refrain from using it unless you want to pay for it
 - o For queue service, use Azure Message Queues, Rabbit MQ
 - o For scheduling services, use a cloud service i.e AWS Scheduler, Azure App Logic or <https://cloud.google.com/scheduler/>

DELIVERABLES

- Public Github repository link
- A README document in your GITHUB repository that has
 - o Final deployed urls of the application

- your design, assumptions, and issues you encountered.
- Data models (i.e an ER)
- Include a link to a short video (max 5 minutes) presenting your project.