



# GOFIES HOSPITAL MANAGEMENT SYSTEM

BLG 411E - Software Engineering

## GROUP MEMBERS

Abdullah Shamout  
Berkay Gürsu  
İbrahim Halil Marsil  
Mustafa Can Çalışkan  
Rasim Berke Turan  
Sarper Öztorun  
Yusuf Emir Sezgin  
Yusuf Şahin

07.01.2025

# Introduction

## Project Overview

The GHMS is a **secure**, **scalable**, and **integrated** hospital management system that streamlines patient, doctor, lab, and administrative operations.

## Objective

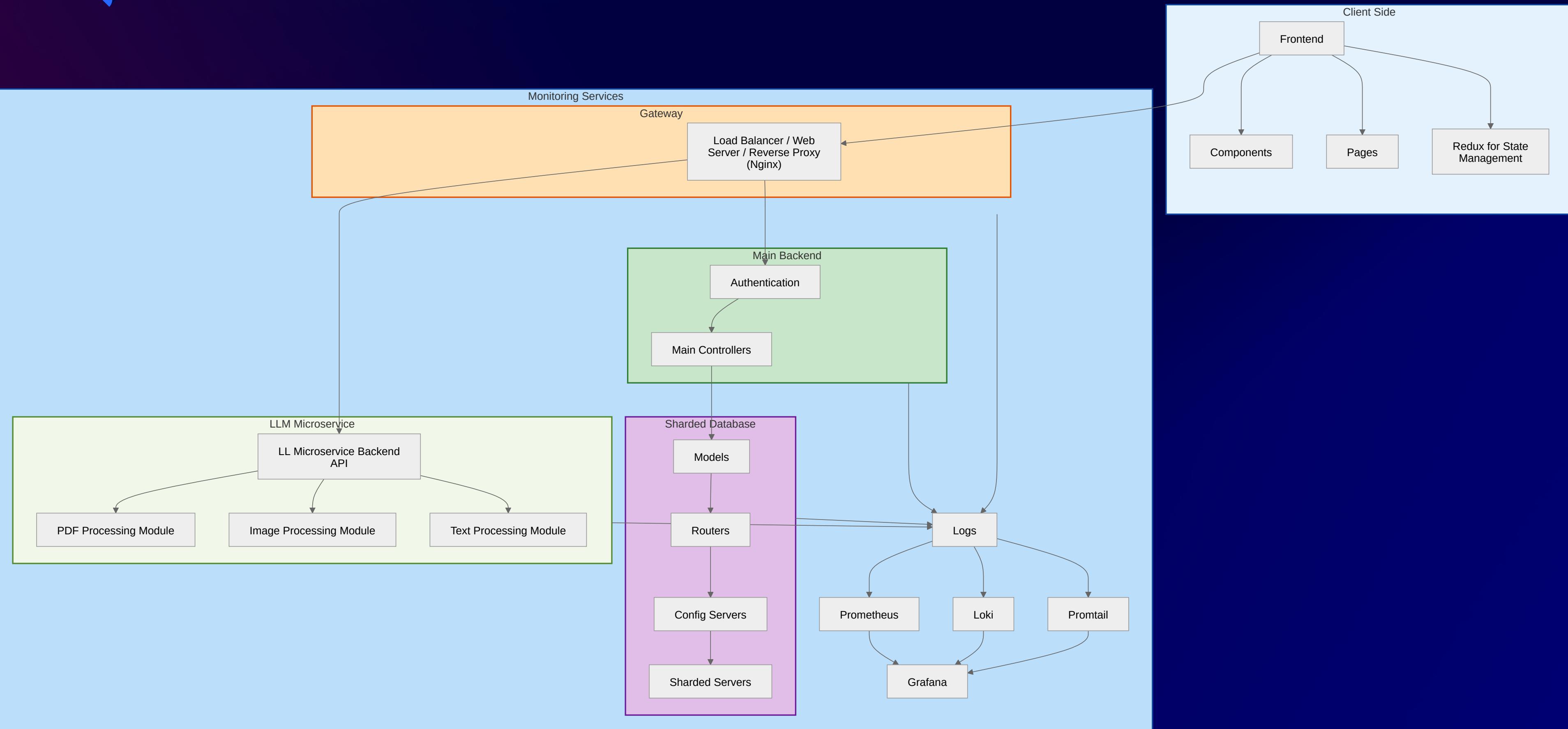
- Enhance hospital workflows with real-time data synchronization.
- Integrate an AI-powered doctor expert system.
- Ensure data security through encryption and role-based access control.



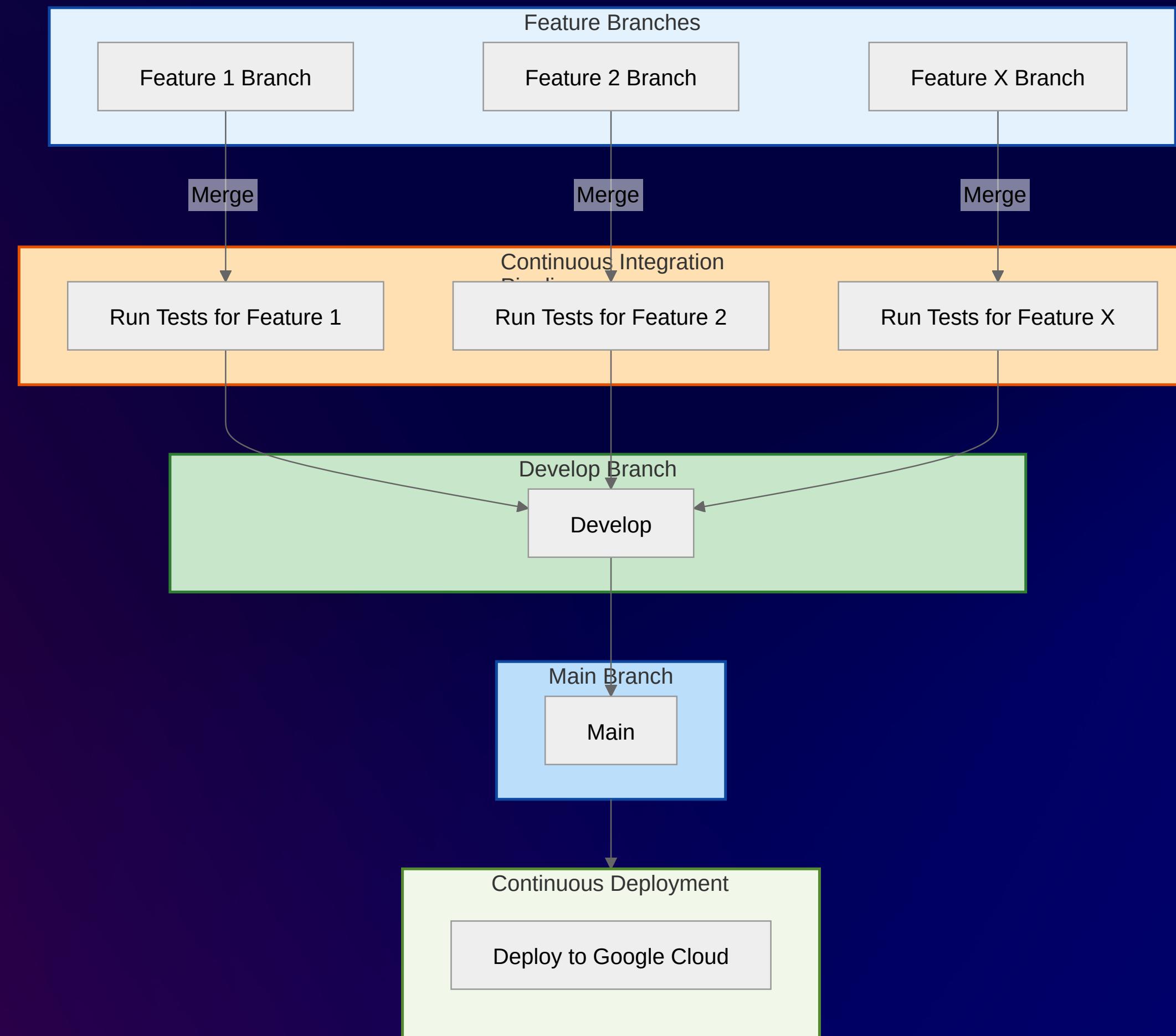
# HIGH LEVEL ARCHITECTURE



Gofies



# DEVELOPMENT STRUCTURE



# Meetings

SOFTENG  
Community · 12 Groups

Meeting:pazar 12-3  
Assignment: [https://docs.google.com/document/d/1X6zlmHv6-CJkYX1w3XFbjH39NquglUU16PVee\\_2MR7U/edit?usp=sharing](https://docs.google.com/document/d/1X6zlmHv6-CJkYX1w3XFbjH39NquglUU16PVee_2MR7U/edit?usp=sharing)  
Spreadsheet: [https://docs.google.com/spreadsheets/d/19jq909lolKrkCANwrcDpl7hdbtLQN\\_2owa7NyxrUjqY/edit?usp=sharing](https://docs.google.com/spreadsheets/d/19jq909lolKrkCANwrcDpl7hdbtLQN_2owa7NyxrUjqY/edit?usp=sharing) Plan: [https://docs.google.com/document/d/1xzmxYmhdNmNEP0sbCU\\_\\_KdMtQxazBFr7pO6dhvjr68/edit?tab=t.0](https://docs.google.com/document/d/1xzmxYmhdNmNEP0sbCU__KdMtQxazBFr7pO6dhvjr68/edit?tab=t.0)

Group created by Sarper Öztorun, on 01/10/2024 at 2:30 pm

Media, links and docs

335 >

The screenshot shows a Google Meet interface. On the left, there's a sidebar for a 'SOFTENG' community group with 12 groups. A yellow callout box highlights 'Meeting:pazar 12-3'. Below it are links for an assignment and a spreadsheet. A message at the bottom states 'Group created by Sarper Öztorun, on 01/10/2024 at 2:30 pm'. The main area shows a grid of participants. The first participant, 'abdullah shamout', has a video thumbnail of a man with glasses and headphones. The second participant, 'Sarper Öztorun', has a purple circle with a white 'S'. The third participant, 'Can Çalışkan', has a video thumbnail of a green cartoon alien. The fourth participant, 'Yusuf Şahin', has a blue circle with a white 'Y'. The fifth participant, 'Yusuf Emir Sezgin', has a video thumbnail of a cartoon character with a halo. The sixth participant, 'Ibrahim Halil Marsil', has a video thumbnail of a pink cake with balloons. The seventh participant, 'Berkay Gürsu', has a green circle with a white 'B'. At the bottom, there are standard video conference controls.

The screenshot shows a Google Meet interface. The main area displays a grid of participants. The first participant, 'abdullah shamout', has a video thumbnail of a man with glasses and headphones. The second participant, 'Sarper Öztorun', has a purple circle with a white 'S'. The third participant, 'Elif Yıldırım', has a video thumbnail of a woman with glasses and a cityscape background. The fourth participant, 'Can Çalışkan', has a video thumbnail of a green cartoon alien. The fifth participant, 'Yusuf Şahin', has a blue circle with a white 'Y'. The sixth participant, 'Berke Turan', has a video thumbnail of a cartoon robot. The seventh participant, 'Yusuf Emir Sezgin', has a video thumbnail of a cartoon character with a halo. The eighth participant, 'Ibrahim Halil Marsil', has a video thumbnail of a pink cake with balloons. The ninth participant, 'Berkay Gürsu', has a green circle with a white 'B'. At the bottom, there are standard video conference controls.

1

SOFTENG

Announcements

Group "Sunum" was added

Saturday

Groups you're in

Add group

Otistik+ Yesterday  
You reacted 😊 to: "adamlı komşumuzu"

Sunum Yesterday  
Berke Turan: template okayse burdan devam...

Video çekimi Yesterday  
Sarper Öztorun: Diğer grup gelin

AI Sunday  
Yusuf Şahin: llama-cpp

Testing Sunday  
Yusuf Şahin: Hoca mutlu

Backend Sunday  
Yusuf Şahin: oldu

Problemler Saturday  
Can ÇALIŞKAN: Okey

Database 25/12/2024  
Can ÇALIŞKAN: Okey sen ara musait olunca

Frontend 25/12/2024  
Berkay Gürsu: tamam o zaman ekstra sayfaya...

DevOPS 04/11/2024  
You reacted 👍 to: "olur aga çözelim"

UI/UX 02/11/2024  
Emir.: nasıl olur?

SOFTENG

Announcements

Create events in announcement groups. Learn more

15/10/2024

Me Community admin  
Forwarded  
Toplantı yarın akşam 7de online  
7:21 pm ✓

Me Community admin  
Forwarded  
Bu seferlik  
7:21 pm ✓

Me Community admin  
Hoca diyordu herkesin katılımı zorunlu  
7:22 pm ✓

20/10/2024

Me Community admin  
GHMS

Backlog Team capacity Current iteration Roadmap My items New view

To Do In Progress Done

GHMS #1 Setup AI algorithms Development Environment and containerize it  
GHMS #11 Setup AI algorithms Development Environment and containerize it  
GHMS #12 setup regex

GHMS #2 Setup Backend Development Environment and containerize it  
GHMS #21 Setup Backend Development Environment and containerize it

GHMS #3 Setup Database Containers and configurations  
GHMS #31 Setup Database Containers and configurations

GHMS #5 Make startup documentation README.md  
GHMS #51 Make startup documentation README.md

Type a message

## GHMS

Add status update



Backlog

Team capacity

Current sprint

Roadmap

My items

+ New view

assignee:@me

19



Discard

Save

## Todo 0

This item hasn't been started



## In Progress 0

This is actively being worked on

## Done 19

This has been completed



✓ GHMS #35



Publish to Cloud

P1 C Sprint 2 DevOps

✓ GHMS #96



AI model backend microservice setup

P1 C Sprint 4 AI Backend DevOps

✓ GHMS #97



AI model decision and integration

P1 C Sprint 4 AI

✓ GHMS #18



setup SSL certificate

P2 C Sprint 2 DevOps

✓ GHMS #47



Grafana and Prometheus

P2 C Sprint 3 DevOps

✓ GHMS #34



setup Domain name and DNS mapping

+ Add item



## Meetings 0

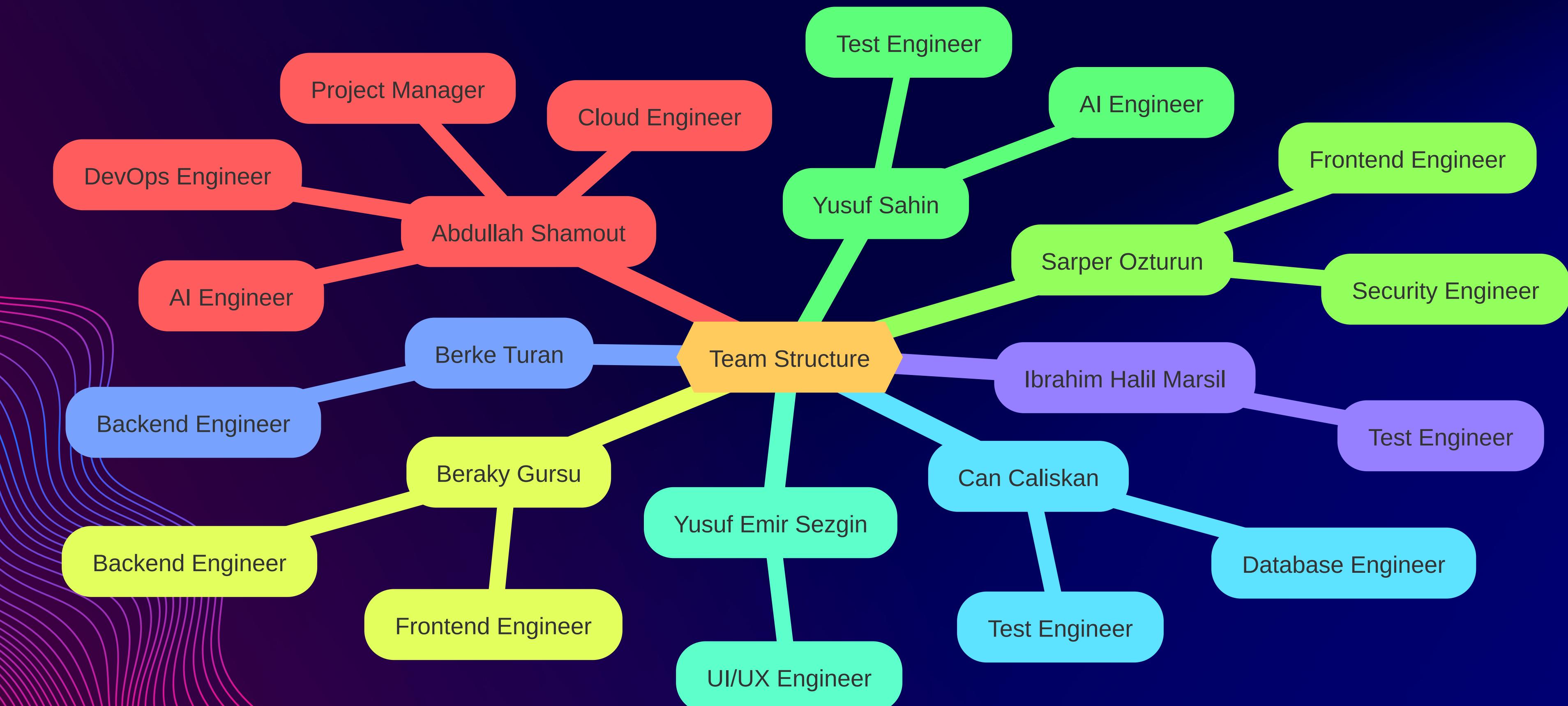


+ Add item

+ Add item

+ Add item

# TEAMS AND RESPONSIBILITIES



# Front-end

- React JavaScript
- Tailwind
- Redux



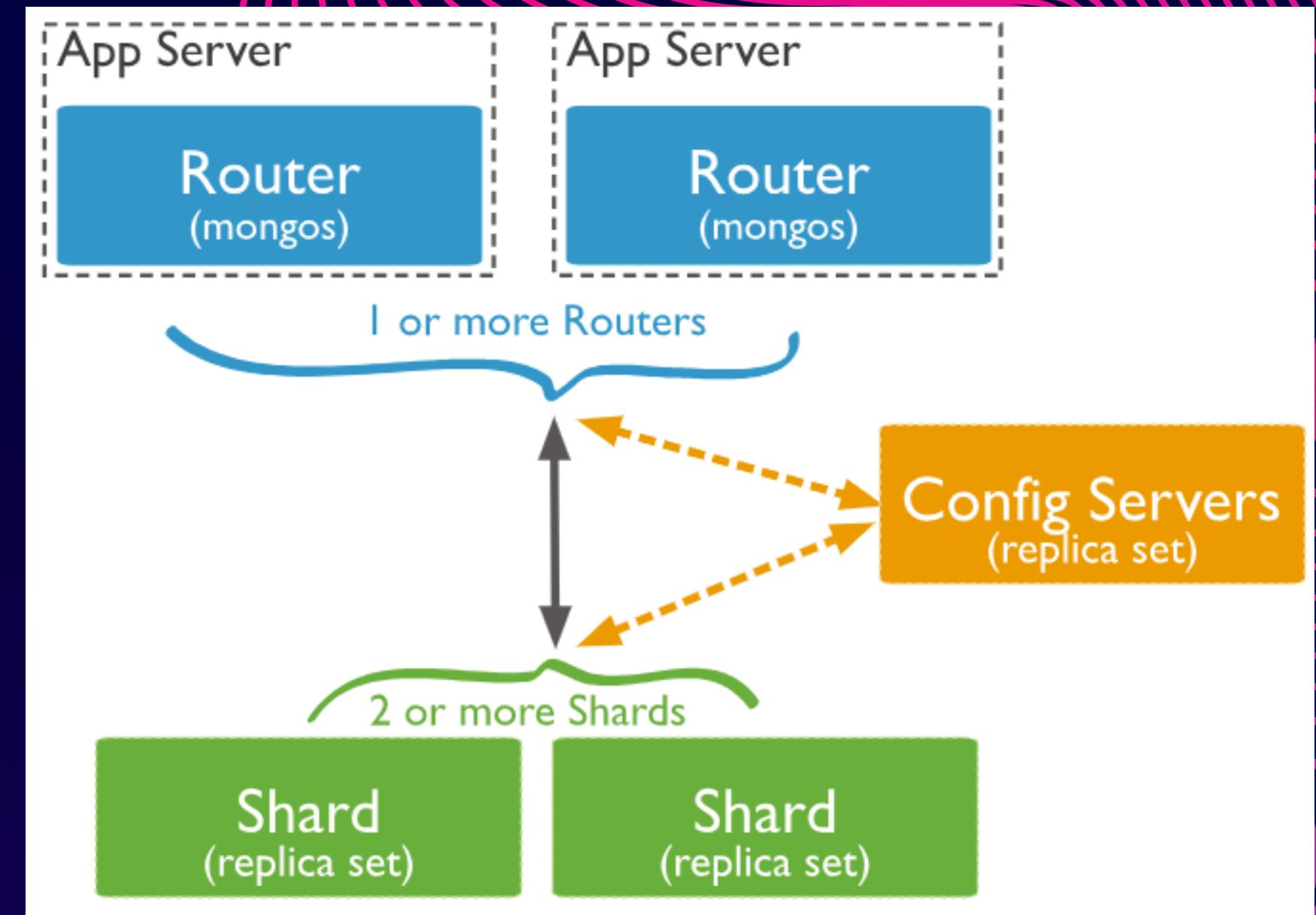
# Back-end

- Node.js
- Express.js
- JWT
- Bcrypt



# Database

- MongoDB



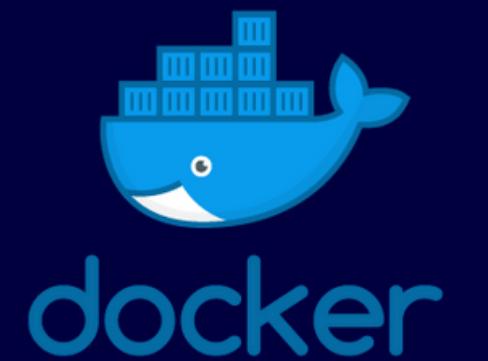
# AI Medical System

- Multi-model
- Microservice
- Expert system



# DevOps

- Docker
- Ngnix
- Prometheus
- Grafana - Loki - Promtail

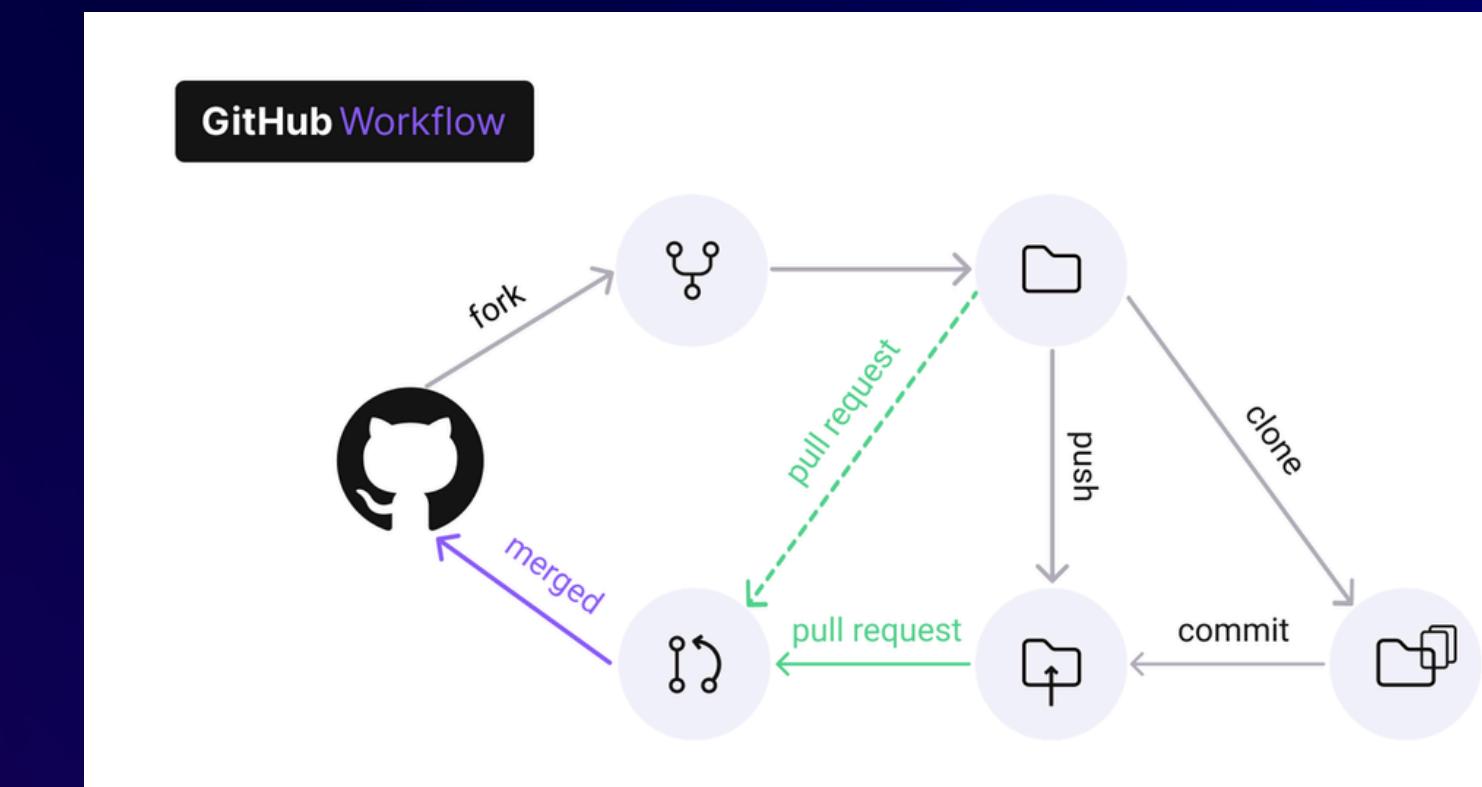


NGINX



# Cloud Services

- Google Cloud
- Terraform
- GitHub Workflows



# Testing

- NMSP
- MMAP
- Jest
- Apache JMeter
- Locust



# Documentation

- Github Projects
- Overleaf/LaTeX
- Markdown
- MakeFiles



## C. Project Scope

### Designated features:

- **Backend:**
  - The architecture will be monolithic. (**Mandatory**)
  - RESTful API will be used.. (**Mandatory**)
  - Employ a JWT authorization system . (**Mandatory**)
  - Control the number of requests to the API within a specified time to prevent overloading the services. (**Optional**)
  - Monitor general user actions to analyze behavior and gain insights into how the system is being used. (**Optional**)
  - Integrate an LLM-based AI chat service to enable interactive user conversations. (**Mandatory**)
- **Database:**
  - Role-based Access Control (RBAC) (**Mandatory**)
  - Real-time Data Synchronization (**Optional**)
  - Audit Log Mechanism to track and record user activities within the system. (**Mandatory**)
  - Data Encryption will be applied for both at-rest and in-transit data. (**Mandatory**)
  - Support for Scalability and Horizontal Partitioning (**Mandatory**)
- **Frontend**
  - Modular Frontend Architecture (**Mandatory**)
  - State Management (**Mandatory**)
  - Real-time Data Updates (**Mandatory**)
  - Progressive Web App (PWA) Capabilities (**Optional**)
  - Lazy Loading and Code Splitting (**Mandatory**)
  - Error Handling (**Mandatory**)
  - UI Animations and Feedback (**Mandatory**)
- **UI/UX:**
  - It will have various color options (night mode, color blindness mode) (**Mandatory**)
  - It will support multiple languages. (**Mandatory**)
  - It will have real-time notifications. (**Mandatory**)
  - Responsive and accessible design. (**Mandatory**)
- **Testing:**
  - Unit & Integration tests (**Mandatory**)
  - API tests (**Mandatory**)
  - Code coverage (**Mandatory**)
- **AI:**
  - Large Language Models (LLMs) (**Mandatory**)
  - Specialized models to feed the LLM (**Mandatory**)
  - Doctor imitating Expert System (**Mandatory**)
- **DevOps:**
  - CI/CD pipeline (**Mandatory**)
  - Orchestration of Docker containers (**Mandatory**)
  - Cloud Deployment (**Mandatory**)
  - Web server implementation "reverse proxy for load balancing" (**Optional**)