



deti

universidade de aveiro  
departamento de eletrónica,  
telecomunicações e informática



## Sistema de Gestão de Atividades Profissionais Confiáveis para Formação Médica na UA

### Milestone 4

#### Grupo 3

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# CONTEXT

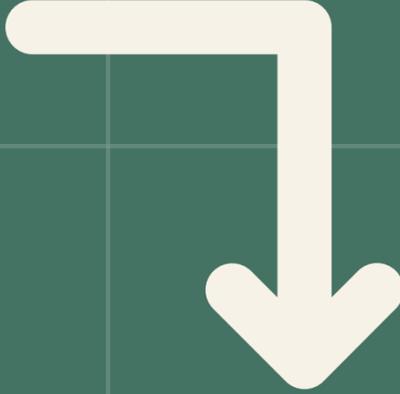
**PAIS**  
**Universidade de Aveiro vai abrir curso de Medicina**  
A atual proposta envolve ensino na UA e orientação tutorial clínica em três Unidades Locais de Saúde, designadamente a ULS Região de Aveiro, a ULS Entre-Douro-e-Vouga e a ULS Gaia/Espinho, no âmbito do Centro Académico Clínico Egas Moniz Health Alliance.



New Medicine course at UA

Constant evolution of students

Evaluation on paper



Integrated digital system for managing Entrustable Professional Activities (EPA)



# PROBLEM

- Too much information on a single sheet of paper
- Difficult organization between student and tutor
- Lack of feedback and statistics



# STATE-OF-THE-ART



Official Integration with University					
EPA Evaluation complete detailed history					
1:1 Easy connection between Tutor and Student					
Automatic individual statistics generation					
Locate family health unit (USF)					
Offline Tolerance for Minimum Functionalities					
Reevaluation Requests					
Multi-year logic					
Feedback Requests					
Upload PDFs with Protocol information					4

# ACTORS

- **Medical Student**
- **Tutor**
- **Administrator**



# FEATURES IMPLEMENTED

## Students

- Self-assess upcoming evaluations
- Request evaluation in future sessions
- Request feedback from tutors
- View performance statistics
- Access educational materials
- Check locations of upcoming evaluations
- View past curricular year details
- Send Suggestions to the support team
- See evaluation details from calendar
- Receive notifications of important events
- View past curricular year details
- Send Suggestions to the support team
- See evaluation details from calendar
- Receive notifications of important events
- Download PDFs with Protocol information

## Core Functionalities

- Multi-language support
- Authentication via LifeScience Login and OTT
- Push notifications
- Offline synchronization of minimum features
- Voice-to-Text

## Tutors

- Evaluate students in real time
- Provide feedback (on request or voluntarily)
- Easily change student
- Monitor student progress via statistics
- Add protocols to a specific evaluation
- Accept/Deny reevaluation requests
- View past curricular year details
- Send Suggestions to the support team
- Download PDFs with Protocol information
- Receive notifications of important events
- Help Page

## Administrators

- Manage courses and associated EPAs
- Import/Export course data via Excel
- View overall course statistics
- Create new evaluations for a year
- Add a protocol by importing a PDF file
- Add a new student/tutor manually
- View past curricular year details
- View student details
- Manage course administrators

# FEATURES IMPLEMENTED

## Design Goals

### **Multi-tenancy**

Supports multiple institutions (e.g., universities, hospitals) with secure data separation and tenant-specific configurations

### **Cross-Curricular Analytics**

Provide insights into competency development across different courses over time

### **Longitudinal Student Tracking**

Monitor student progress across academic years and curricular units, ensuring continuity in EPA-based assessment

### **Yearly Editions**

Manage different course editions (e.g., Clinical Medicine I 2025, 2026...) with separate evaluations and tutors

# Functional Requirements



**User Authentication**



**Notifications**



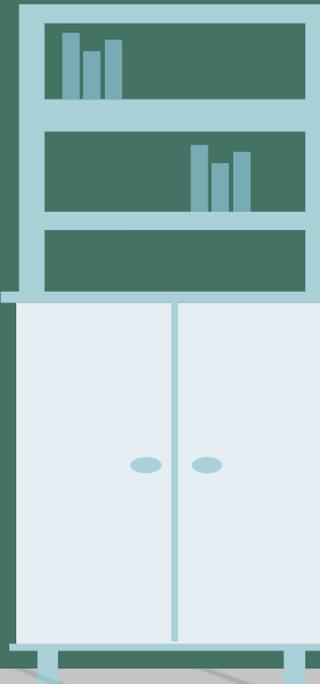
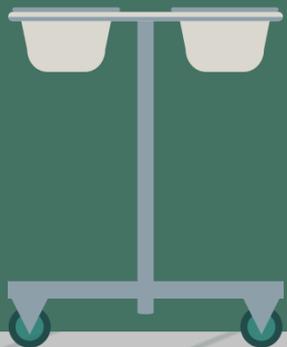
**Statistics**



**Evaluation and Feedback**



**Generation of Excel/PDF files**



# Functional Requirements



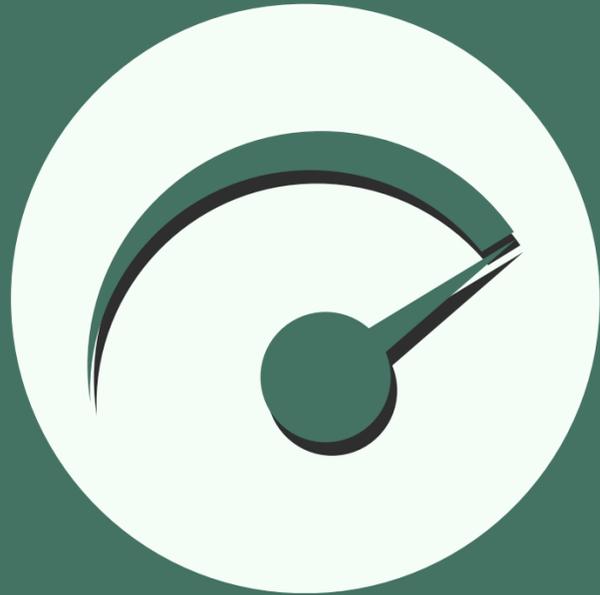
- The system must have authentication via UA's IdP using WSO2
- The student must be able to request feedback from the tutor for either the operation of a MEC or feedback on a previous/upcoming evaluation
- The system should allow students to ask for reevaluations of a specific MEC on an upcoming evaluation
- The system must only allow the USF4 and USF8 to be submitted if given feedback
- The system should automatically calculate the CAM score for each student according to the established criteria
- The system must allow the tutors to submit the USF evaluation for a student
- The tutor must be able to reply to a feedback request by a student

- The student needs to be able to insert their self-evaluation regarding their autonomy on performing each MEC a few days before the next evaluation
- The administrator should be able to associate a student with a tutor
- A student must be able to check all completed evaluation grades and observations
- The student needs to be able to insert their self-evaluation regarding strong points and weak points in each of the MECs
- The system should allow tutors to accept or decline a student's request for reevaluation
- The system must present graphs and progress bars relative to a student's progress
- A tutor must be able to add observations to an evaluation (strong and negative points)



**45 FUNCTIONAL REQUIREMENTS** 

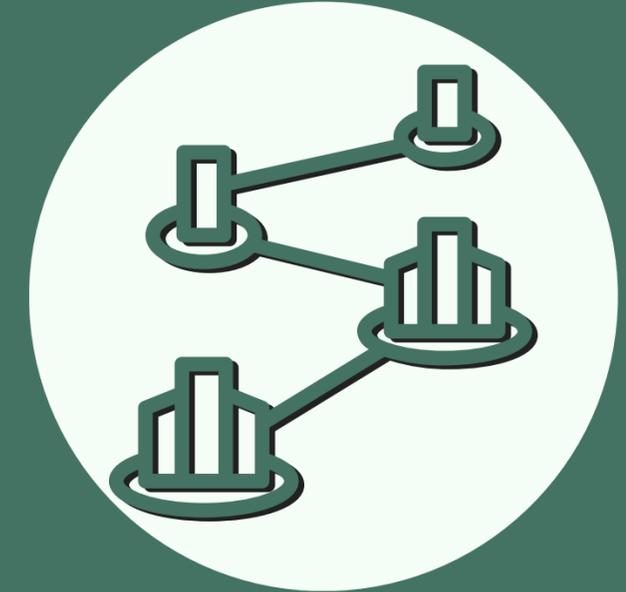
# Non-Functional Requirements



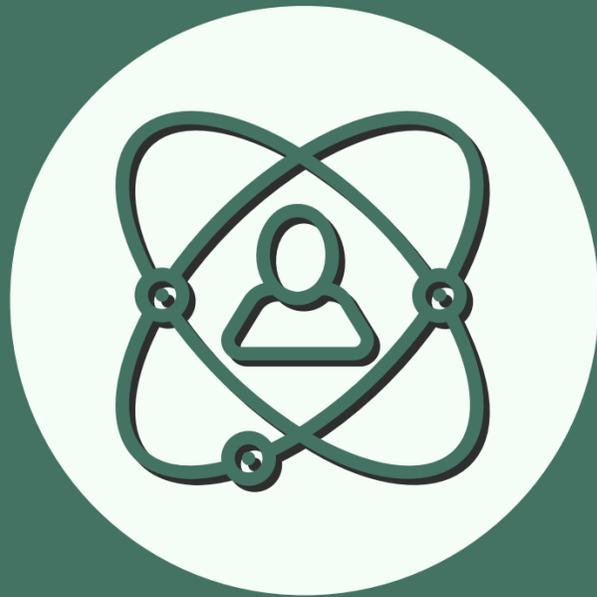
Performance



Maintainability



Scalability



User Experience



Security and Privacy



Offline Functionality

# Non-Functional Requirements

A logging system must be implemented to record all significant errors and warnings occurring in the system

The system must maintain consistent response times as user traffic increases.

Specific changes made offline should be synchronized with the server once the connection is reestablished.

Role-based access control (RBAC) must be enforced to grant different permission levels (students, tutors, administrators).

The system must adapt to smaller screens, such as mobile phones and tablets.

Forms must provide visual feedback when users make errors

The system should have a support section with FAQs and a contact form for users to report issues

The system must efficiently handle a high number of requests, ensuring low latency and high performance even under increasing load.

The system must allow the tutors to submit the USF evaluation for a student

Users inputs should be sanitized to avoid common security problems such as XSS, SQL injection or CSRF

Authentication must be handled via UA's IdP (Identity Provider) using secure authentication methods,

The user interface must follow a consistent and simple design to avoid confusion

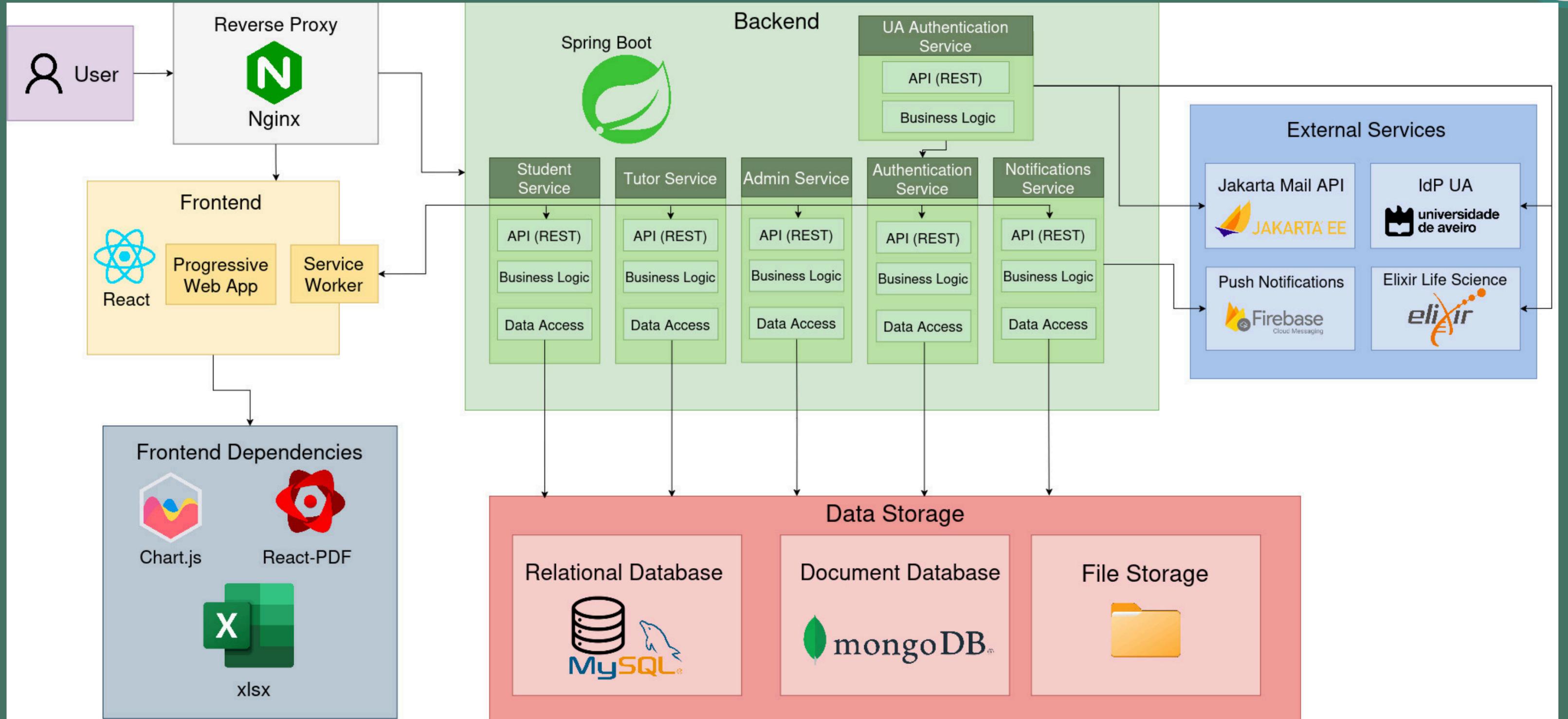
Icons must be representative of their function and consistent across all pages

The system should have a guide for first-time users to help them navigate the platform in case they have any doubts

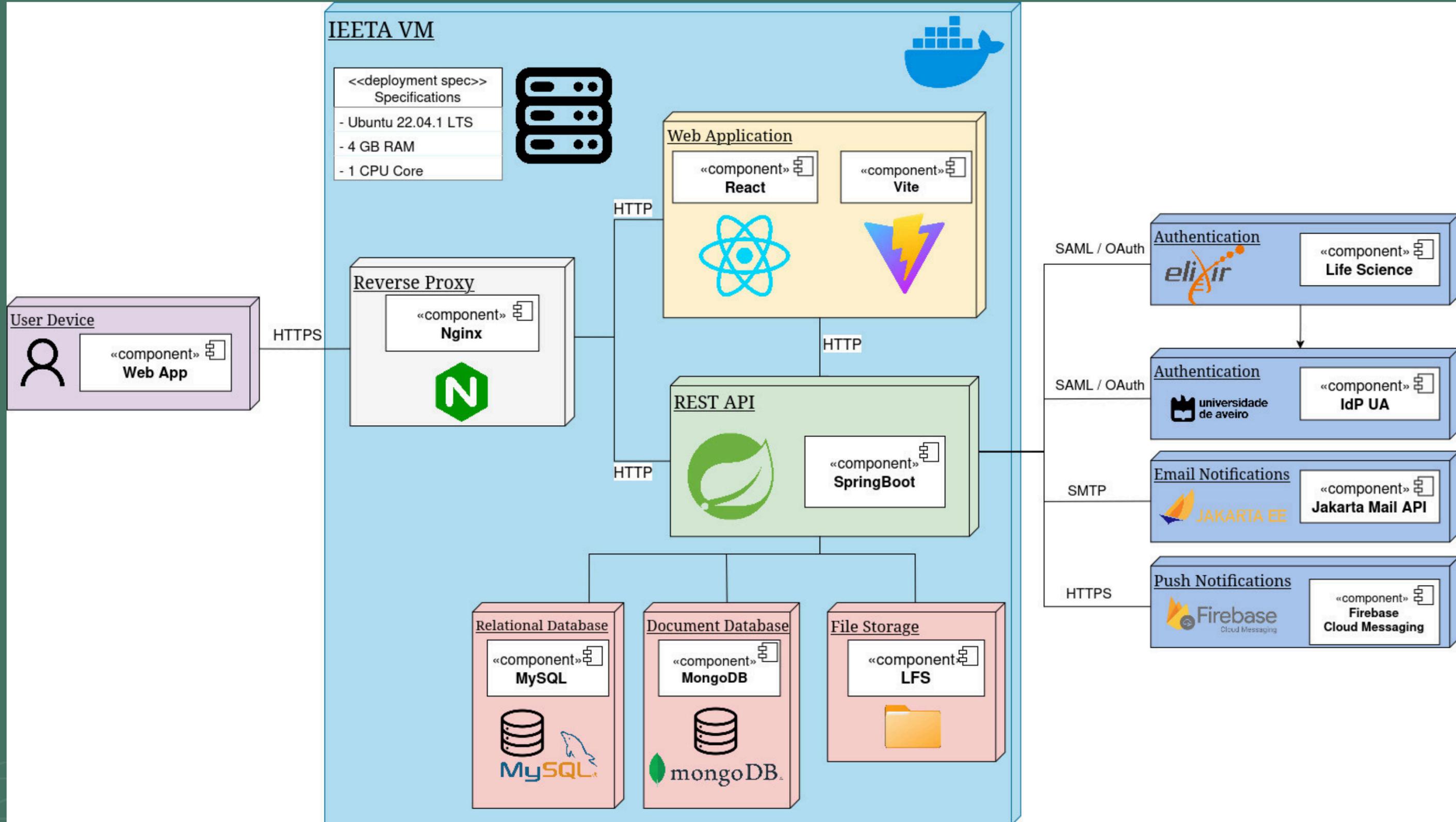
22 NON-FUNCTIONAL REQUIREMENTS



# Architecture Diagram



# Deployment Diagram





# USABILITY TESTS

## SUS SCORES

**PROTOTYPE**

**81**



**DEPLOYED SOLUTION**

**89**



**We improved on the imprecisions the prototype had**



**We adopted both the suggestions from the clients and our own improvements**

# Backlog



- Followed a Git Flow branching model

The screenshot shows a Jira backlog for the 'EPA project'. The interface includes a search bar, navigation tabs (Backlog, Team capacity, Current iteration, Roadmap, My items, New view), and a filter bar. The backlog is organized into four columns:

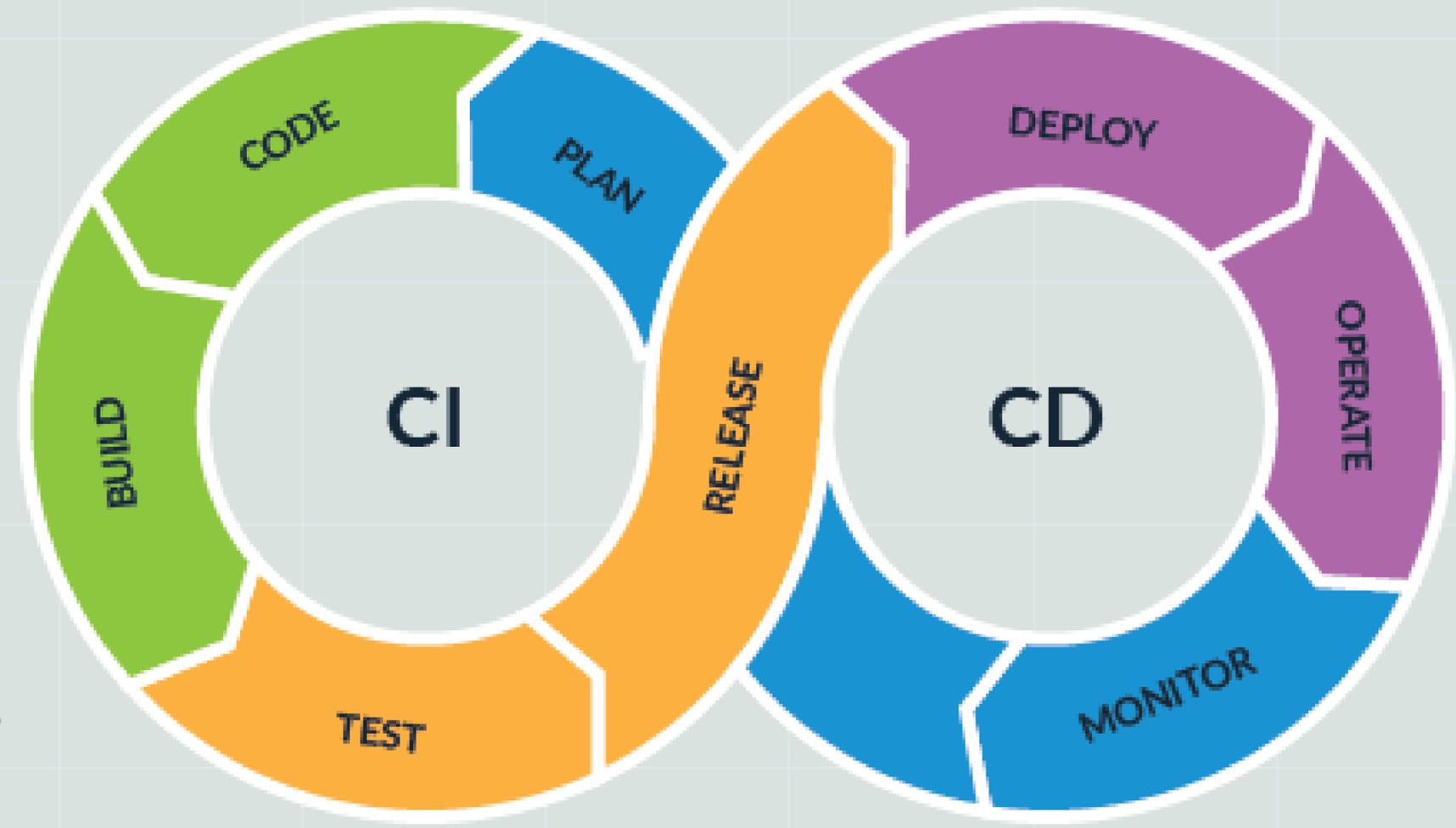
- User Stories:** 0 items, Estimate: 0.
- Todo:** 4 / 30 items, Estimate: 4. This column contains four items:
  - EPA #548: Develop the M4 powerpoint (P0, Iteration 15)
  - EPA #549: Create a CD pipeline (P0, 2)
  - EPA #495: Implement Integration Tests (P1, 1, Iteration 13)
  - EPA #525: Investigate Google Cloud (P2, 1, Iteration 15)
- In Progress:** 3 / 10 items, Estimate: 4. This column contains three items:
  - EPA #516: Fix bug where user is receiving the same notification multiple times (P0, 1, Iteration 13)
  - EPA #551: Send Welcome Email on First Login (P0, 1, Iteration 15)
  - EPA #537: Implement logging system (P0, 2, Iteration 14)
- Done:** 534 items, Estimate: 403. This column contains five items:
  - EPA #540: General UI bugs (P0, 1, Iteration 14)
  - EPA #410: Develop Administrator Management Page (P0, 1, Iteration 10)
  - EPA #546: Fix Year logic in all pages (P0, 1, Iteration 15)
  - EPA #511: Update tutor and student management tables (P0, 2, Iteration 13)
  - EPA #534: Profile Image not displaying correctly when website is deployed (P0, 1, Iteration 14)
  - EPA #496: Implement Role based Security Service (P0, 2, Iteration 13)

- + 340 issues
- 223 PR's
- 28 User Stories

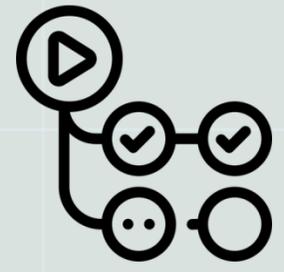
- 2 necessary reviews for development branch

- 4 necessary reviews for master branch

# CI/CD



**Maven™**



# ACHIEVEMENTS

- Delivered the project on time and within scope, following **AGILE/SCRUM** methodology.
- We successfully **implemented 100% of the originally proposed user stories** and also added several new ones to enhance functionality.
- Conducted usability testing using the System Usability Scale (SUS), achieving a **high score of 89**
- Developed a **responsive user interface** ensuring **compatibility across all types of devices**
- Used **CI/CD pipelines** to automate build and deployment processes.
- **Captured the client's interest** and kept them engaged in the whole process



# DIFFICULTIES

- **Communication with university services**
- **Implementing 3 different authentication methods**
- **Misaligned expectations between stakeholders and development team**
- **Design concordance between team members**
- **First time using new technologies (Firebase, NGINX, Service Worker)**



# Future Work

- **Improve reliability on updates with automated tests**
- **Real life load tests - June 6th**
- **Negotiate potential integration into  
University systems**
- **Improve backend robustness**
- **Tweak UI**





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# Thank you!

**Does anyone have any questions?**

**Follow the project updates on:**

<https://github.com/bio-informatics/EPA>

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[evalmed.pt](https://evalmed.pt)



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be sustainable