

Slovak Technical University in Bratislava
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Government Help Application For Immigrants

Vývoj Aplikácií s Viacvrstvovou Architektúrou

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1. Introduction

GHAI Application is a digital document provider app and document-approving system in one. Citizens can view their documents and request new ones. We want to deliver the best digitalization experience for the state and for citizens.

1.1. What is the application?

The application is called Government Help Application For Immigrants (GHAI). It is a cross-platform digital document provider app and document approving system designed to streamline and simplify the immigration experience. GHAI serves as a comprehensive platform offering access to accurate information, document submission, application status tracking, legal consultations, and community support for immigrants.

1.2. Who will use the application?

Immigrants navigating through immigration processes in a new country will primarily use the application. They will rely on it to access information on their legal rights, obligations, and immigration procedures, submit various documents and applications to government authorities, track the status of their requests, receive consultations with lawyers and specialists, and interact with the community for support. There are also been administrators and managers.

1.3. Where will it be used?

The application can be used on various platforms, including websites, mobile devices, and electronic terminals in government structures. Immigrants can access it from anywhere, whether they are at home, work, or government offices. (But in learning practice, we are going to build the desktop-only support)

1.4. When will it be used?

The application will be used whenever immigrants need assistance with immigration-related matters, such as understanding their legal rights, submitting documents and applications, tracking application statuses, seeking legal consultations, or interacting with the community for support. It provides on-demand access to essential services and information, available 24/7 in theory.

1.5. Why use it?

Immigrants will use the application to address the challenges they face during immigration processes. It provides them with easy access to accurate information, facilitates document submission, ensures transparency in application processes, offers expert legal guidance, and fosters community support. By using the application, immigrants can navigate the complexities of immigration more efficiently, reducing bureaucratic hurdles and promoting integration into their new country.

2. Business Goals & KPI's

Objective area	Sub-goal	Sub-goal	Key performance indicators (KPI)
Inefficient old paper system	Exchange the old one with electronic document management system.	Give ability to submit various documents and applications to government authorities through the app.	Increase the number of documents managed through the app to 1500 per day.
Expand immigrants' interest	Create a vision that the country is gracious and open to immigrants.	Increase the number of immigrant workers to grow the economy.	Increase in the percentage of satisfied immigrants by 25% annually.
Guarantee participant safety	Adherence to Data Protection Regulations (GDPR, CCPA, etc.).	Provide a robust system with superior authentication and authorization.	Maintain a risk profile below a certain threshold (e.g., 3 on a scale of 1-5).
Minimizing costs	Reduce the number of staff members.	Reduce costs with hosting several government structures for immigrants.	Achieve a 15% reduction in maintenance taxes and hosting costs annually.
Accessibility and Usability	Make the same availability as for modern generation, and the same for elders.	Create an accessible and easy to understand user interface.	Achieve a 90% rate of fulfilment of participants' preferences.
Reliability	Create a robust and back-up architecture to account for emergencies.	Create a dependable and error-resistant service.	Achieve 99.9% system uptime and reduce downtime to less than 0.1%, while adhering to the agreed Service Level Agreement (SLA).

3. Analyze

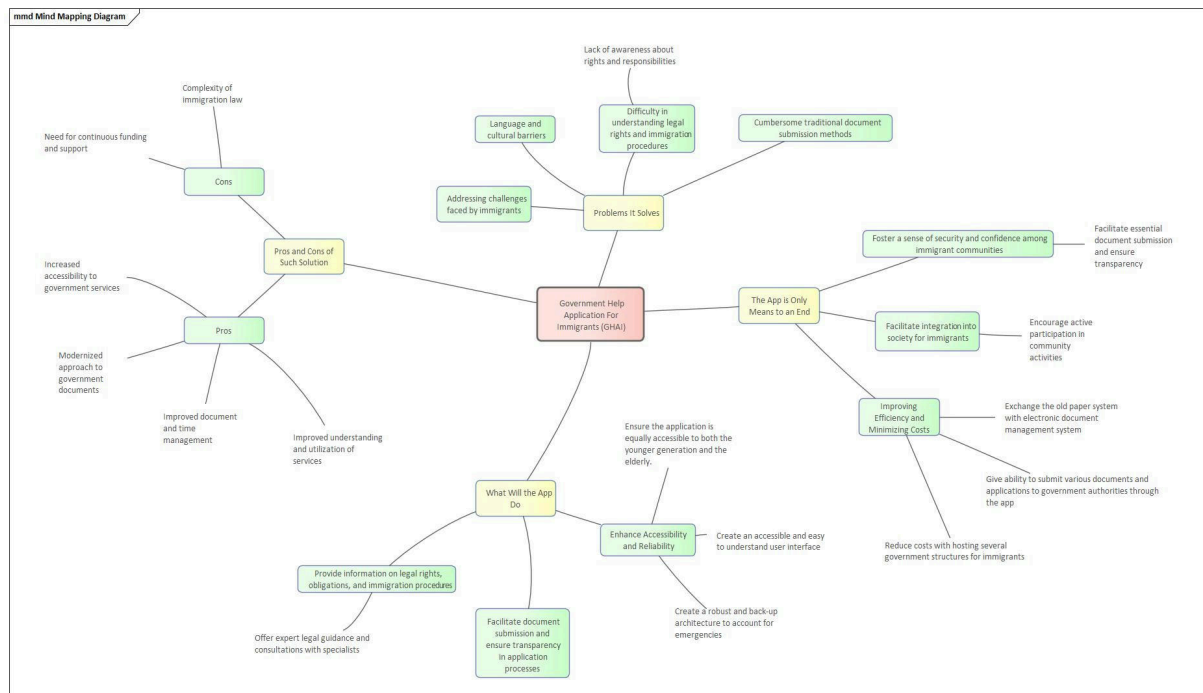


Figure 1: Mind Map of the GHAI Application

3.1. Risks

Developing and implementing the Government Help Application for Immigrants (GHAI) presents various risks and complexities that need careful consideration and mitigation strategies. These challenges can be categorized into technological, organizational, security, and legal aspects.

3.1.1. Technological Risks

- **Integration Complexity:** Integrating GHAI with existing government systems and databases could pose significant challenges. Data format inconsistencies, legacy system limitations, and varying levels of technological infrastructure across different government bodies may require extensive development effort and inter-agency coordination.
- **Scalability and Performance:** The system should be able to handle a large number of users and requests concurrently without compromising performance or user experience. Ensuring scalability and responsiveness, especially during peak usage periods, requires robust infrastructure planning and potential cloud-based solutions.
- **Data Migration and Accuracy:** Migrating data from existing paper-based systems to the digital platform introduces risks of data loss, corruption, or inaccuracies. Implementing rigorous data validation and verification processes is crucial to maintain data integrity and avoid erroneous information dissemination.
- **Maintaining Up-to-Date Information:** Immigration laws and procedures can change frequently. Keeping the information portal and document templates current necessitates a robust update mechanism and close collaboration with legal experts and government agencies.

3.1.2. Organizational Risks

- **Resistance to Change:** Implementing a new digital system might be met with resistance from staff accustomed to existing paper-based processes. Providing comprehensive training and support

for government employees is essential to ensure smooth adoption and efficient utilization of the platform.

- **Interdepartmental Coordination:** Efficient collaboration between different government departments is crucial for GHAI's success. Establishing clear communication channels, defining roles and responsibilities, and fostering a culture of cooperation are necessary to avoid bureaucratic hurdles and delays.
- **Funding and Resource Allocation:** Sustaining the development, maintenance, and continuous improvement of GHAI requires adequate and consistent funding. Securing long-term financial commitment from relevant government bodies is essential to ensure the platform's viability and effectiveness.

3.1.3. Security Risks

- **Data Breaches and Cyberattacks:** Storing sensitive personal information of immigrants makes GHAI a potential target for cyberattacks. Implementing robust security measures, including data encryption, secure authentication protocols, and regular vulnerability assessments, is critical to protect user data and maintain system integrity.
- **Identity Theft and Fraud:** The system must have strong identity verification mechanisms to prevent identity theft and fraudulent activities. Utilizing multi-factor authentication, document verification tools, and anti-fraud algorithms can mitigate these risks.
- **Privacy Concerns:** Complying with data protection regulations like GDPR and CCPA is essential to ensure user privacy and avoid legal repercussions. Implementing privacy-by-design principles, obtaining informed consent for data collection, and providing transparent data usage policies are crucial steps.

3.1.4. Legal Risks

- **Compliance with Immigration Laws:** GHAI must accurately reflect current immigration laws and procedures to avoid misleading users and potential legal challenges. Regular legal reviews and updates are necessary to ensure compliance with evolving legislation.
- **Accessibility for Users with Disabilities:** The platform needs to comply with accessibility standards to ensure equal access for users with disabilities. Implementing features like screen readers, alternative text descriptions, and keyboard navigation is essential to meet these requirements.
- **Liability for Errors or Misinformation:** Errors in the information provided or the processing of documents could lead to legal liabilities. Establishing clear disclaimers, implementing quality control mechanisms, and having a robust system for addressing user complaints can mitigate these risks.

3.1.5. Mitigation Strategies

- **Phased Implementation:** Starting with a pilot program within a limited scope allows for testing and refinement before full-scale deployment, minimizing disruptions and facilitating a smoother transition.
- **Agile Development Approach:** Utilizing an iterative development process enables flexibility, adaptability, and continuous improvement based on user feedback and changing requirements.
- **User-Centered Design:** Focusing on user needs and incorporating user feedback throughout the development process ensures the platform is intuitive, accessible, and effectively addresses user pain points.

- **Collaboration with Experts:** Engaging legal experts, security specialists, and technology professionals provides valuable insights and guidance to ensure GHAI meets legal, security, and technical standards.
- **Transparency and Communication:** Maintaining open communication with stakeholders, including government agencies, immigrant communities, and the public, fosters trust and understanding of the platform's goals and functionalities.

3.2. Costs

Cost Categories and Ranges:

Cost Category	Lower Bound	Upper Bound
Development Costs	\$100,000	\$200,000
Regulatory Compliance	\$20,000	\$30,000
Hosting & Infrastructure	\$15,000	\$25,000
Maintenance & Support	\$30,000	\$50,000
Community Support	\$10,000	\$20,000
Marketing & Promotion	\$5,000	\$30,000

3.2.1. Calculating Mean and Standard Deviation

To determine the overall cost statistically, we need to calculate the mean and standard deviation for each category. For that we can estimate a range for the mean and standard deviation based on the given bounds.

Estimated Mean Cost:

- **Lower Bound Mean:** \$225,000(sum of lower bounds)
- **Upper Bound Mean:** \$355,000(sum of upper bounds)

Therefore, the estimated mean cost could range from \$225,000 to \$415,000.

3.2.2. Estimated Standard Deviation

Lets assume a conservative range based on the difference between the lower and upper bounds of each category.

- Assume a standard deviation of 20% of the mean for each category.

3.2.3. Interpreting the Results

With the estimated mean and standard deviation, we can interpret the potential cost of the application statistically. For example, using the lower bound mean of \$225,000 and a standard deviation of 20%, we can say:

- There's roughly a 68% chance that the actual cost will fall within \$180,000 and \$270,000.
- There's roughly a 95% chance that the actual cost will fall within \$135,000 and \$315,000.

4. Actors

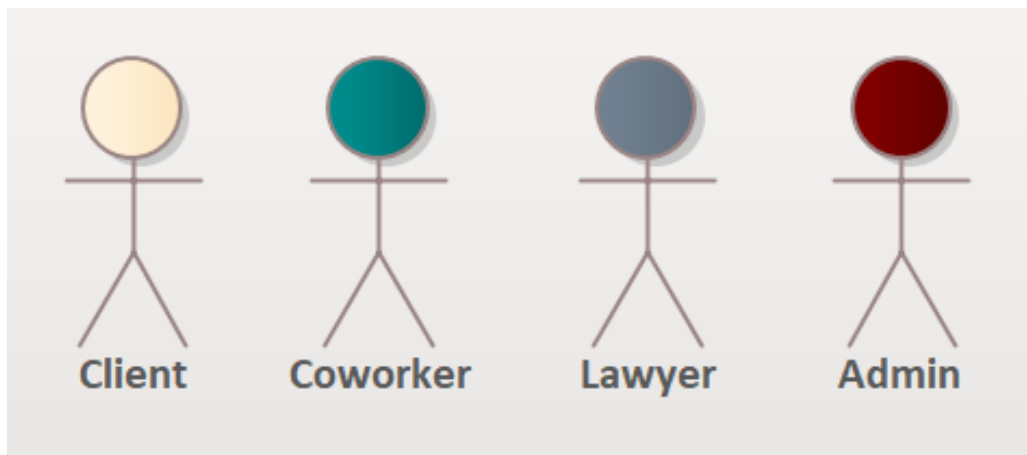


Figure 2: Actors of the GHAI Application

4.1. Admin

Manager, Administrator, Supervisor, Coordinator, Chief, Deputy.

4.1.1. Key Attributes

- **Coworker Registration**
 - Has an ability to registration a new coworker in for his department, with setting custom privileges and responsibilities, with preferred countries, etc.
- **Document Requests Verification**
 - May to see and check all submitted documents verifications with all data that coworkers made on.
- **Creating and changing documents templates**
 - Templates, fields, requires, names, and required documents to obtain a new one by following internal government lawyers information.

4.1.2. Responsibilities

- Coworkers registration. This process might take around 15-30 minutes per coworker, depending on the complexity of the privileges and responsibilities settings.
- Updating documents templates. This is a more complex task and might take around 30-60 minutes per template, depending on the complexity of the template.
- Verification document approved requests. Depending on the volume of requests, this could take around 10-20 minutes per request.
- Updating data and information on information portal. Same as for updating doc templates.

4.1.3. Frequency of use

Likely to use the app several times a week as their responsibilities involve regular updates and verifications, also with increased usage during peak periods. These peak periods could be related to the end of the month or quarter when there is a higher volume of document requests and updates. On the weekends, they might use it less frequently.

4.1.4. Business knowledge

They would need a moderate level of expertise in the subject matter. While they are responsible for tasks that could require in-depth knowledge, such as creating and updating document templates, registering coworkers, and verifying document requests, they may also rely on external resources

such as legal advice or ready-made templates. Therefore, a strong understanding of the app and its functionality is the key requirement.

4.2. Coworker

4.3. Key Attributes

- **Document Requests Approving**
 - Approving incoming document requests in their region, department (preferably to their preferred_countries).
- **Updating Information on Information Portal**
 - By signal and with admin agreement ability to update information.
- **Client Registration Approving**
 - Checking initial documents (as passport) that client has upload that are corresponding to his identity.

4.3.1. Responsibilities

- Documents requests. Without specific details, it's hard to make an accurate assessment. It will probably take as long as it does now.
- Client registration approving. This might take around 3-8 minutes per request.
- Updating information on information portal. This could take around 15-30 minutes, depending on the amount of information to be updated.

4.3.2. Frequency of use

Coworkers use of the app is every day except weekends as they are responsible for approving document requests and updating information on the portal.

4.3.3. Business knowledge

They should be experts in the field, as they are responsible for approving document requests and client registrations, as well as updating information on the portal. Their usage might increase during periods of high activity in their specific departments or regions. For example, if they are involved in immigration services, they might see increased activity during periods of high immigration.

4.4. Client

4.4.1. Key Attributes

- **Documents Uploading**
 - Has an ability, as and while registration to upload existing documents.
- **Creating Document Requests**
 - To obtain some document by existing template, with filled values that template obtain and having required documents.
- **Setting Custom Notifications**
 - There is ability to have notifications about ending expiry_date for example. Or setting customs.

4.4.2. Time Spent in the app

- Documents Uploading: This might take around 1-2 minutes, depending on the number and size of the documents.
- Creating Document Requests: This could take around 5 minutes
- Checking on Document Requests: Up to 2-5 minutes.
- Looking for a lower consultant: Up to 3-5 minutes.

- Browsing through informational portal: The time spent on this starts from 1 minute, and can easily reach 15 hours.

4.4.3. Frequency of use

The frequency can vary greatly depending on the client's needs. It could range from once a month to daily, especially if they are actively browsing through info portal or creating document requests.

4.4.4. Business knowledge

Out clients do not need some level of understanding of the app or laws, basic understanding of how to use a computer or phone is enough.

5. Project Management

5.1. Task areas

Task Area	Description
UIxUX	This area focuses on creating the user interface (UI) and user experience (UX). UI is responsible for the visual representation of the application, including the design of interface elements, their layout, and interaction with the user. UX, on the other hand, encompasses the overall experience of using the application, including ease of use, intuitiveness, and satisfaction of user needs.
CLIENT	This area of tasks is related to the development of the client-side of the application. The client-side is responsible for how the application is presented and works on the user's end, authentication and localization management, etc.
DATABASE	The database area includes the development, management, and maintenance of databases used by the application. This involves designing data schemas, creating services, and ensuring data security.
CI/DC	This area of tasks is responsible for Continuous Integration (CI) and Continuous Deployment (CD) of the application. The goal is to automate the processes of building, testing, and deploying the application to ensure the application does not have any build and runtime errors.
SQL	The SQL task area includes writing queries, creating tables, managing data access, and optimizing query performance.
API	An API (Application Programming Interface) is a set of instructions and data structures that allow different software components to interact with each other. The API task area involves development, documentation, and support of application programming interfaces.

5.2. RACI Matrix

With knowing about task areas and developers' preferences, team members were aligned in next RACI Matrix.

Task Area	Mykhailo (Backend developer)	Arthur (Architekt)	Dariia (Designer)	Vadym (Tester)	Artem (Frontend developer)
UIxUX		I	R		R
CLIENT		I			R
DATABASE	R/A	R/A		R/A	I
CI/DC		A			
SQL	R/C		R/C	R/C	R/C
API	R/C	R/C		R/C	

Note

R - Responsible: The person who performs the task.

A - Accountable: The person who has final responsibility for the task and makes decisions.

C - Consulted: person who is consulted before a decision is made or while performing a task.

I - Informed: person kept informed of the results or progress of a task.

6. Functional and Non-Functional Requirements

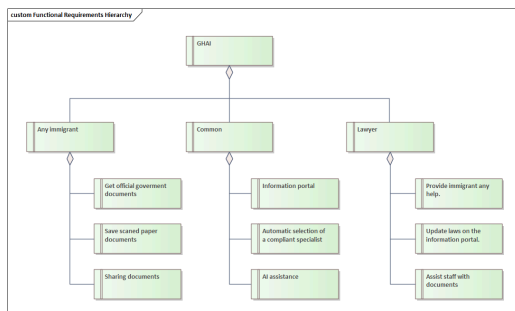


Figure 3: Functional Requirements

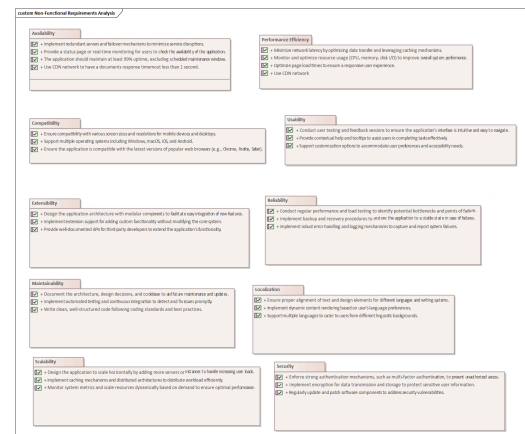


Figure 4: Non-Functional Requirements

6.1. Functional Requirements

Figure 3 represent a description of internal and external factors the process of handling client requests. Internal resources, such as access to information about required documents, and external factors such as client-inputted information and decisions made by employees, play a crucial role in this process.

6.2. Non-Functional Requirements

Figure 4 depicts various stages of processing client information. It includes inputting information, verifying its accuracy, reviewing client requests, providing the necessary resources, making decisions regarding documents, and, depending on those decisions, either sending the document to the client or providing information on the reasons for rejection.

7. Class Diagram

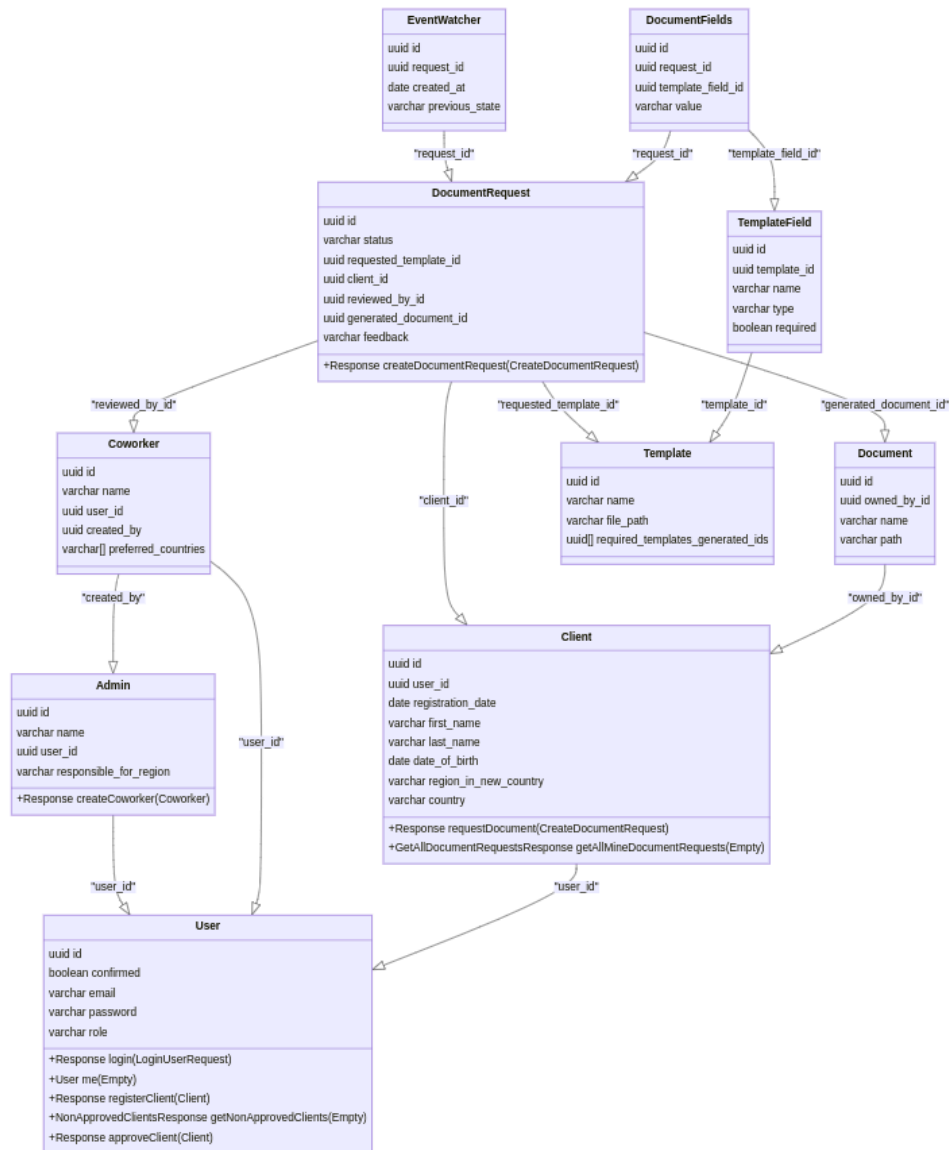


Figure 5: Class Diagram

Figure 5 provides a detailed overview of the GHAI application's class structure, illustrating the relationships and interactions between various classes and interfaces. The diagram showcases key components such as User, Coworker, Admin, EventWatcher, DocumentRequest, Client, Template, Dokument and TemplateField, highlighting their attributes and methods. The class diagram serves as a blueprint for the application's object-oriented design, facilitating the implementation and maintenance of the system's functionalities.

8. Package Diagram

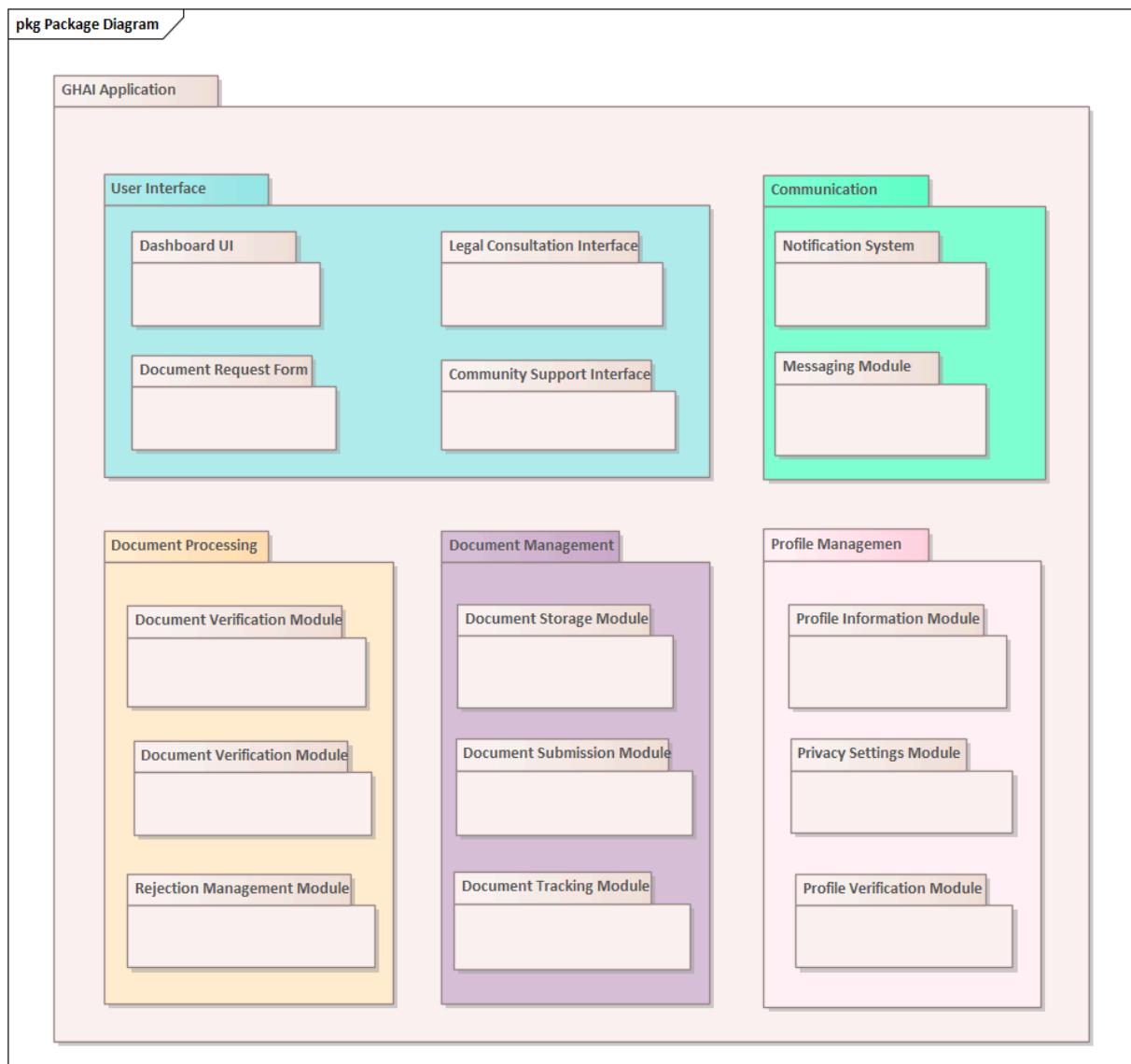


Figure 6: Package Diagram

Figure 6 illustrates the package structure of the GHAI application, showcasing the various components and their interrelationships. The diagram is organized into these packages: User Interface, Communication, Document Processing, Document Management, Profile Management. Each package encapsulates related classes and interfaces, providing a clear overview of the application's architecture and functionality.

9. Business Layer (Archimate model)

9.1. Organization Viewpoint

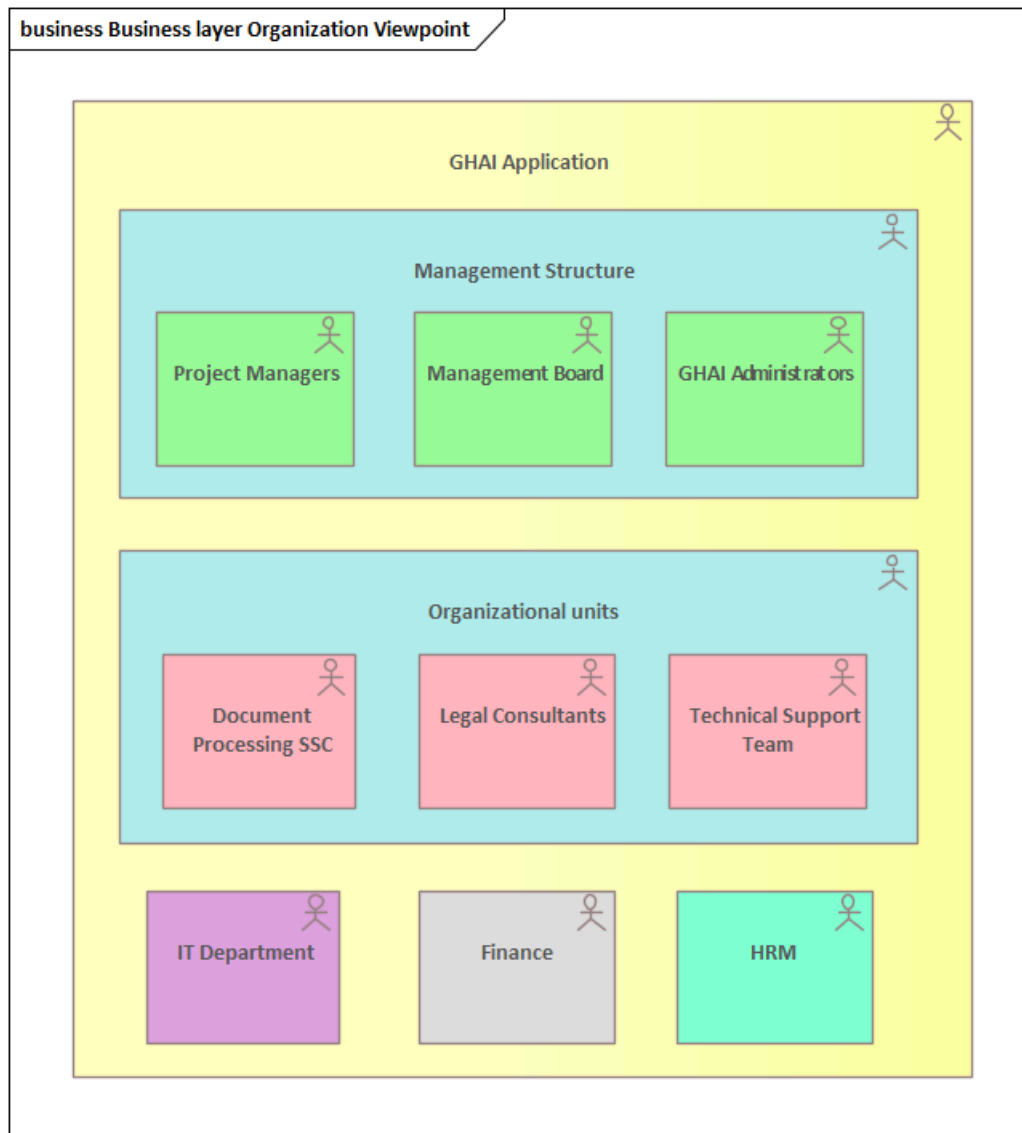


Figure 7: Organization Viewpoint

Figure 7 depicts the organizational structure supporting the GHAI application from a Business Layer perspective. It showcases the GHAI application at the center, governed by a management structure consisting of Project Managers, a Management Board, and GHAI Administrators. The operational aspects are handled by various organizational units, including Document Processing SSC, Legal Consultants, and a Technical Support Team, along with supporting departments like IT, Finance, and HRM, ensuring the efficient functioning and maintenance of the GHAI application.

9.2. Cooperation Viewpoint

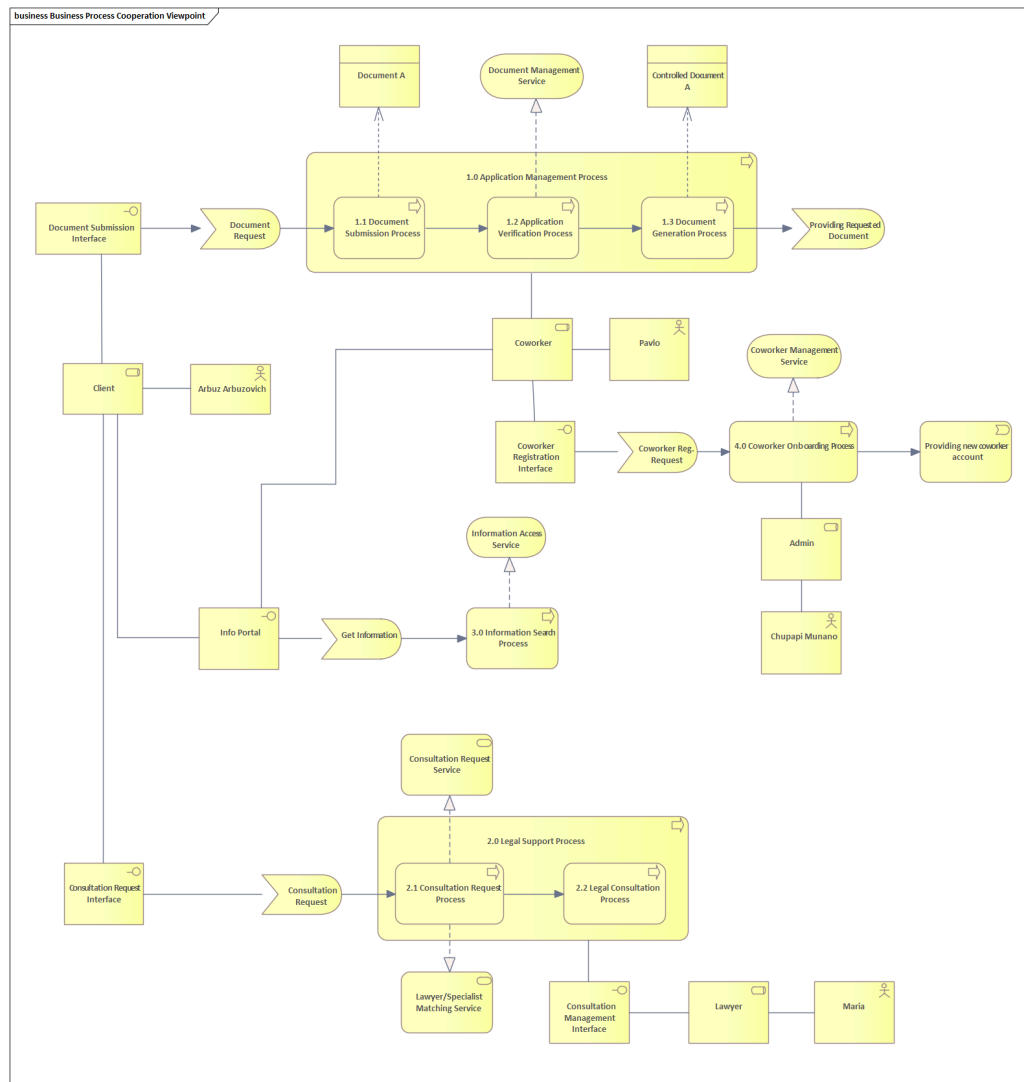


Figure 8: Business Cooperation Viewpoint

Figure 8 visualizes four key business processes: Application Management for handling document requests, Coworker Onboarding for integrating new staff, Information Search for finding specific data, and Legal Support for facilitating client interactions with lawyers. These processes involve various actors like clients, coworkers, admins, and lawyers, utilizing services such as document management, coworker management, and lawyer matching to ensure smooth operations. The diagram effectively depicts the flow of information and the interrelationships between these elements within the business ecosystem.

9.3. Product Viewpoint

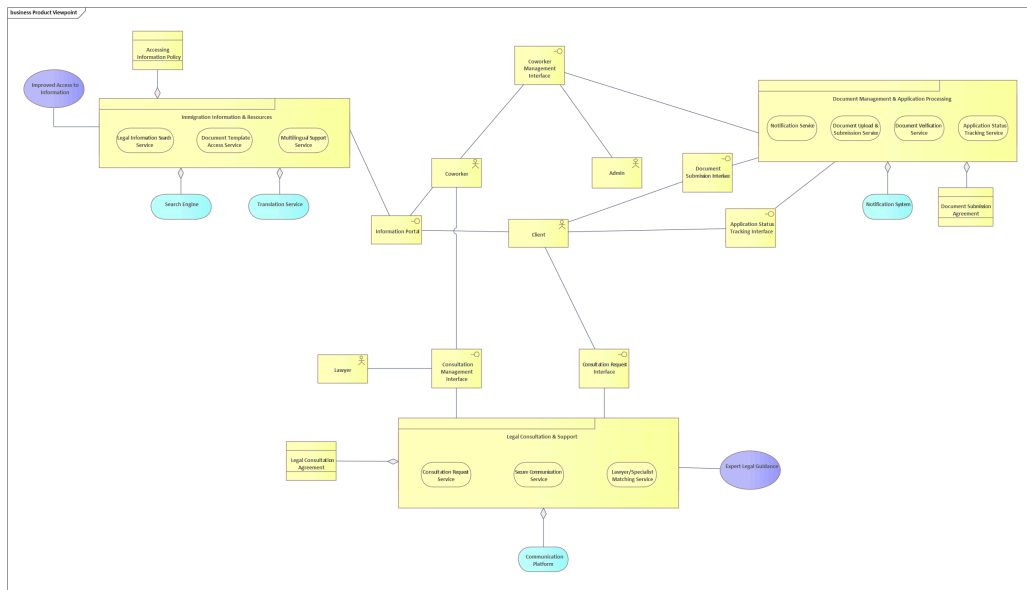


Figure 9: Product Viewpoint

Figure 9 illustrates a comprehensive business product encompassing immigration and legal support services. It features “Immigration Information & Resources” with tools like search engines and multilingual support, “Document Management & Application Processing” for handling submissions and tracking applications, and “Legal Consultation & Support” connecting clients with lawyers and offering expert guidance. This interconnected system ensures smooth navigation through immigration processes and access to legal assistance, empowering users with the necessary resources and support.

10. Application Layer (Archimate model)

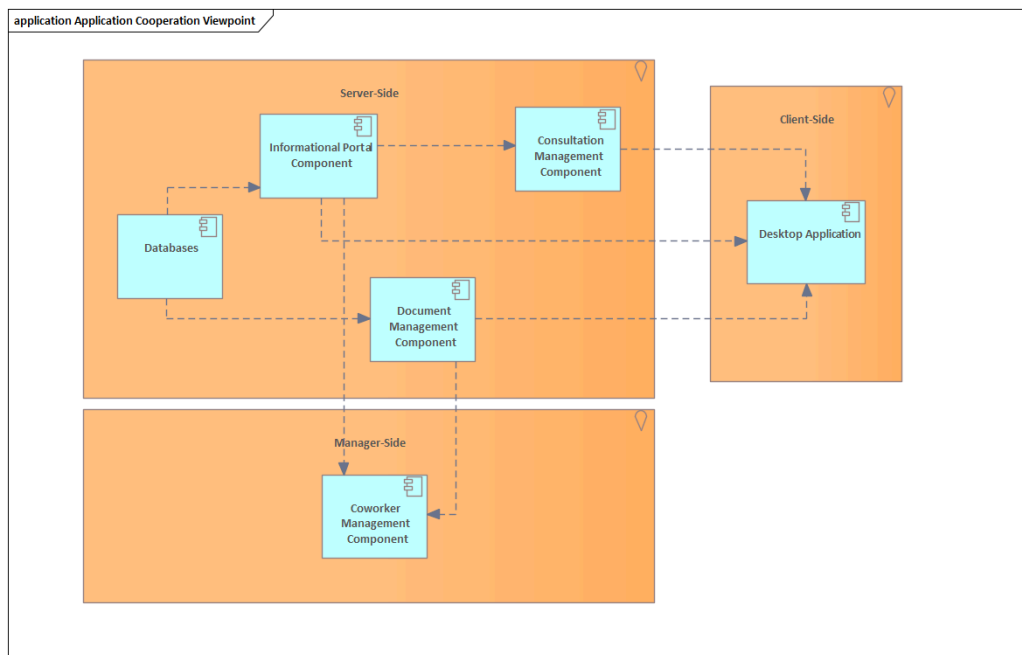


Figure 10: Application Cooperation Viewpoint

Figure 10 diagram, from an application cooperation viewpoint, illustrates the interaction between server-side and client-side components. The server-side encompasses the “Informational Portal,” “Consultation Management,” and “Document Management” components, which interface with databases and provide functionalities to users. On the client-side, users interact with the system through a “Desktop Application,” accessing information and services provided by the server-side components. The “Coworker Management” component, located on the manager-side, suggests additional functionalities for managing internal operations related to coworkers.

11. Technology Layer (Archimate model)

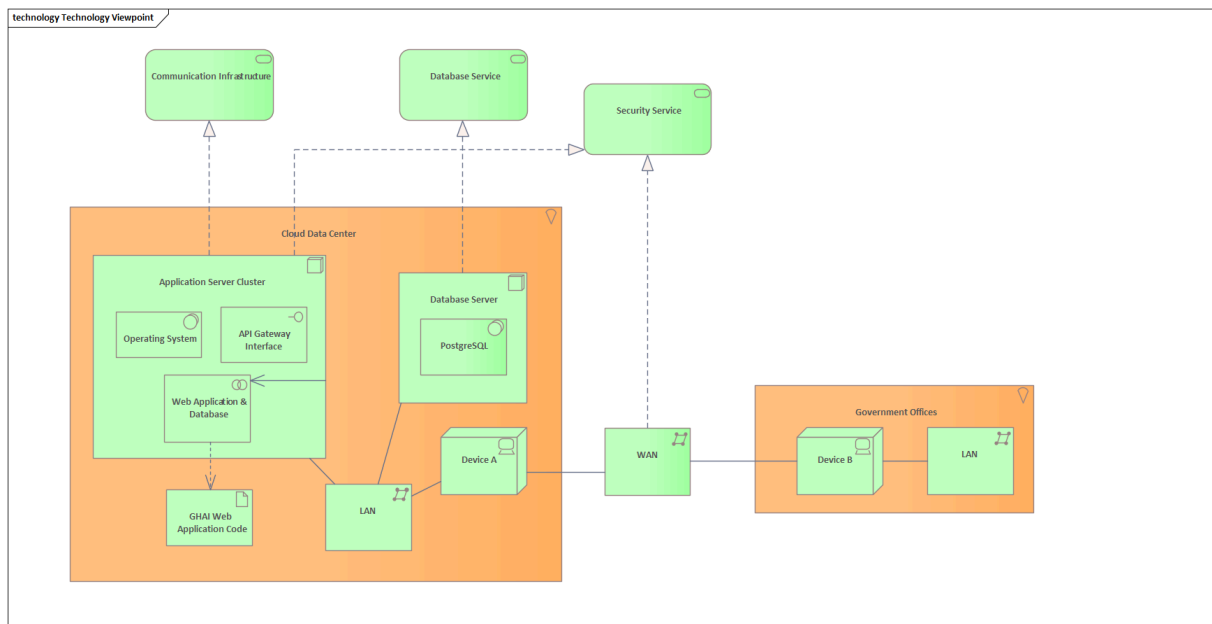


Figure 11: Technology Cooperation Viewpoint

Figure 11 diagram presents a Technology Viewpoint of the GHAI system, showcasing its infrastructure and supporting services. The core components reside within a Cloud Data Center, including application servers, databases, and an API gateway, while government offices house additional devices connected via a separate network. Essential technology services such as Database Service, Security Service, and Communication Infrastructure Service ensure the smooth operation, data management, and secure communication throughout the GHAI ecosystem.

12. Layer model (Archimate model)

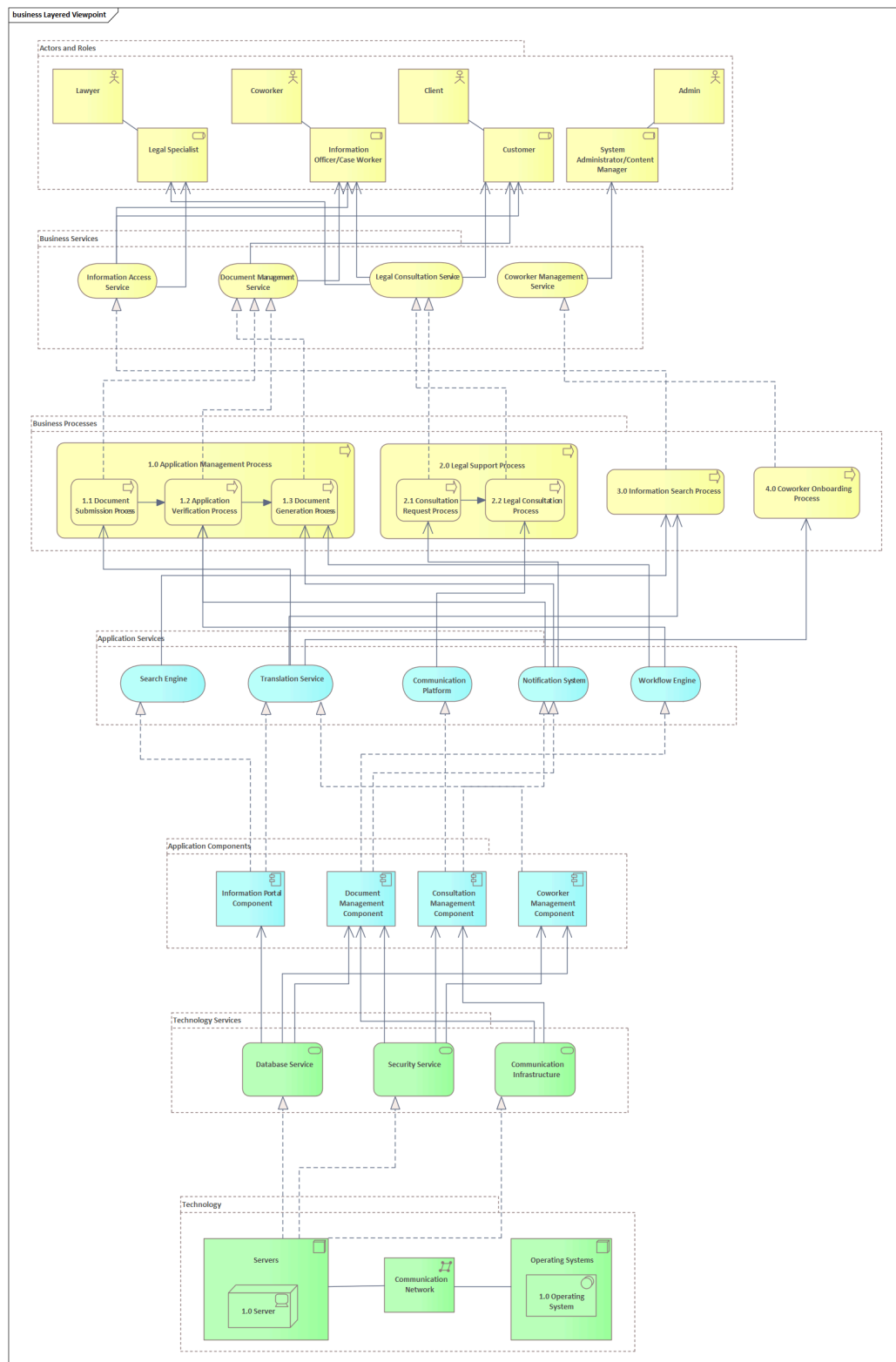


Figure 12: Layer Model

Figure 12 presents a comprehensive layer model of the GHAI application, provides a holistic perspective of the organization's structure, processes, and supporting technology. It depicts various actors and roles interacting with business services such as information access, document management, and legal consultation. These services are further supported by business processes like application management, legal support, information search, and coworker onboarding, which utilize application services and ultimately rely on underlying technology infrastructure like servers and operating systems. The diagram effectively illustrates the interconnectedness and dependencies between different layers within the organization.

13. Business Process Model

13.1. Registration

Figure 13 is an activity diagram [1] of the process of creating and verifying a new user.

First, the user enters his/her data into the system, it is initially verified by the user himself/herself, and then it is sent to the internal system, where it undergoes internal checks on whether the user exists in the system, etc. Then the user is asked to take a photo with the document and a scan of the document itself. This information is recorded in the system and sent to the employee for verification. The employee checks the data manually, further checks in the State Register, and also checks with the help of artificial intelligence. At the end of all checks, the user gets access to his account.

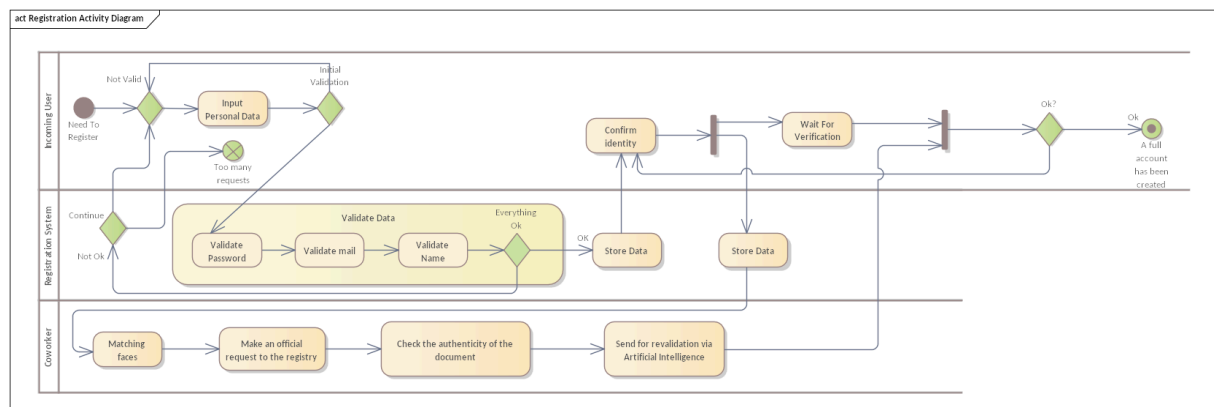


Figure 13: Activity Diagram of Registration Process

13.2. Search For Information

Figure 14 represents the activity diagram depicting the sequence of actions involved in the document search process.

Initially, the user provides input to the system in the form of search queries or criteria. The system then processes this input and begins the search operation. It scans its database and possibly external sources to find relevant documents or information matching the user's criteria.

Once the search operation is completed, the system presents the retrieved documents or information to the user. This may involve organizing and displaying the results in a user-friendly format, possibly with options for further refining or filtering the results.

The user can then review the presented information and take necessary actions based on their requirements. This could include accessing specific documents, further refining the search, or utilizing the retrieved information for their purposes.

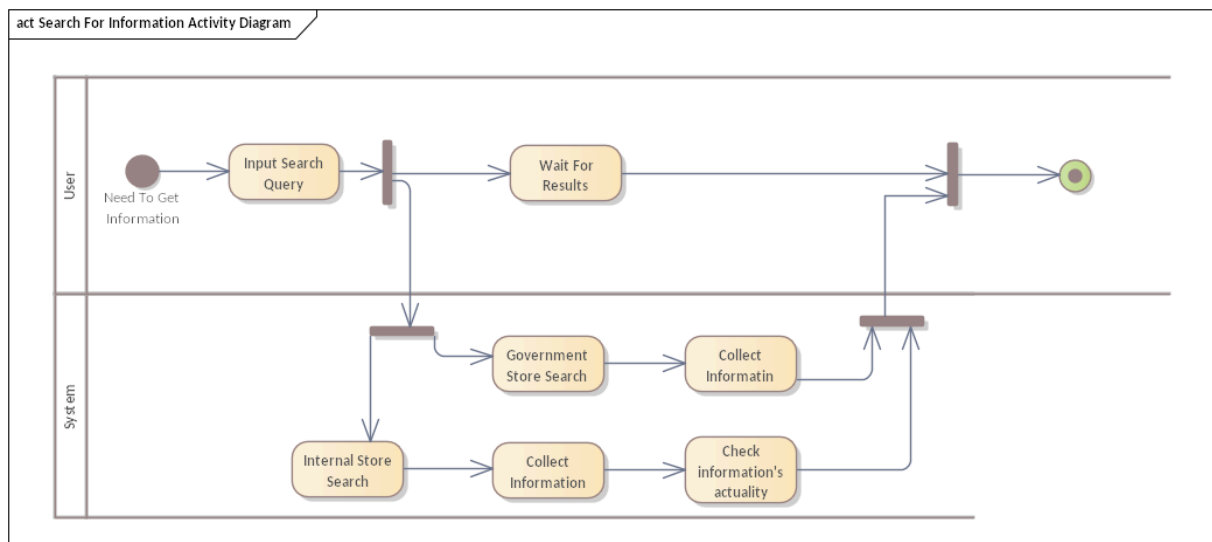


Figure 14: Activity Diagram of Document Search Process

13.3. Request for Document

Figure 15 represents the activity diagram of the process of requesting a document from the system.

The case is opened when the user have a need to obtain a document. The user fills in the form with the necessary data and uploads the required documents. The system checks the data and documents for compliance with the requirements. If the data and documents are correct, the system opens new document request and session between with staff. From now on, the only thing the user can do is either read feedback from staff or upload additional documents. As session is opened, user have to wait, for processing.

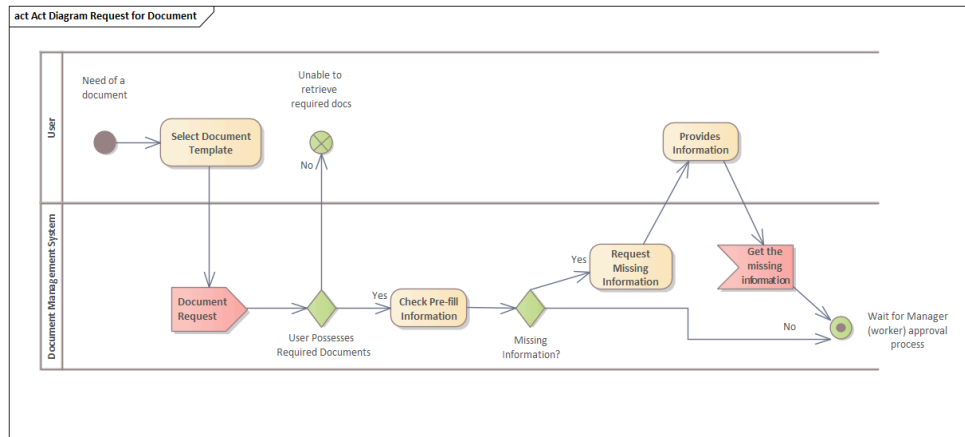


Figure 15: Activity Diagram of Request for Document Process

13.4. Requesting Consultations with Lawyers

Figure 16 represents the activity diagram of the process of requesting consultations with lawyers and specialists.

The process begins when the client submits a request for a consultation, providing details about their legal issue or question. The system then processes the request, investigates the client's issue, and checks for eligibility. If the request is valid, the system assigns a lawyer or specialist to the case. The lawyer or specialist then reviews the request, prepares for the consultation, and provides the necessary legal guidance and support to the client.

As a result, the client receives the legal guidance and support they need, and the process is completed.

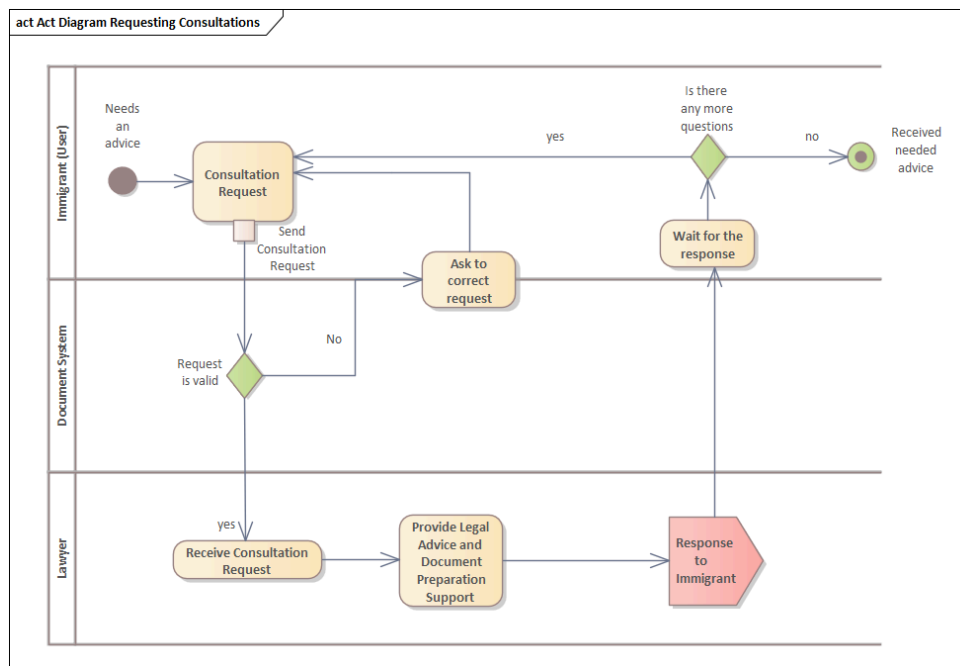


Figure 16: Activity Diagram of Requesting Consultations with Lawyers Process

13.5. Coworker Registration

Figure 17 represents the activity diagram of the process of registering a new coworker in the system.

This figure illustrates the activity diagram outlining the process of onboarding a new coworker and setting up their system profile. The process begins when a new employee joins the organization. An administrator initiates the creation of a profile for the coworker, specifying their preferred countries. Subsequently, the system sets up a coworker linked region by administrator credentials. Once that, the coworker receives their credentials through email or other variants.

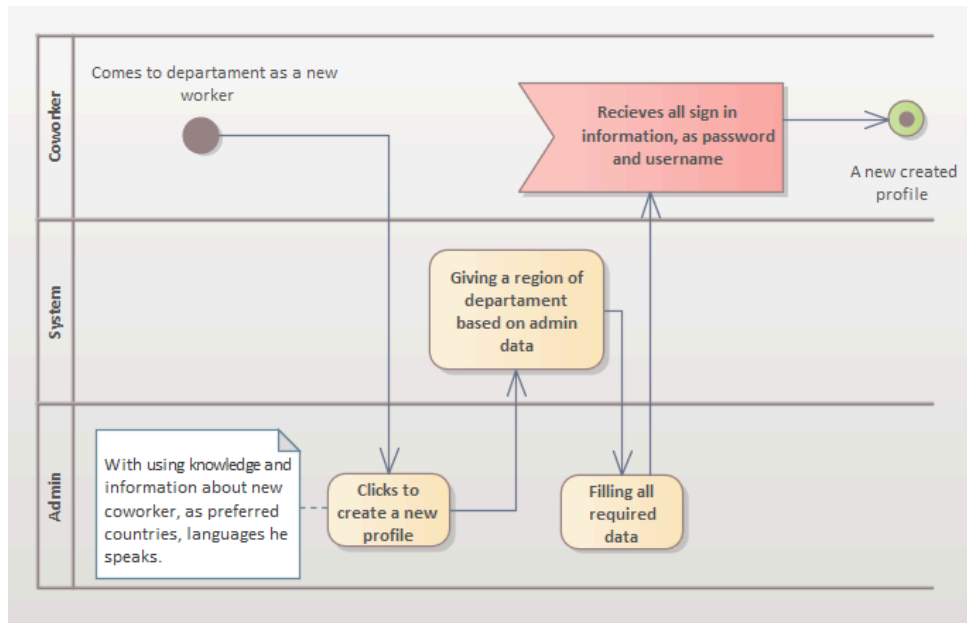


Figure 17: Activity Diagram of Coworker Registration Process

This workflow also might be showed as sequence diagram [2]:

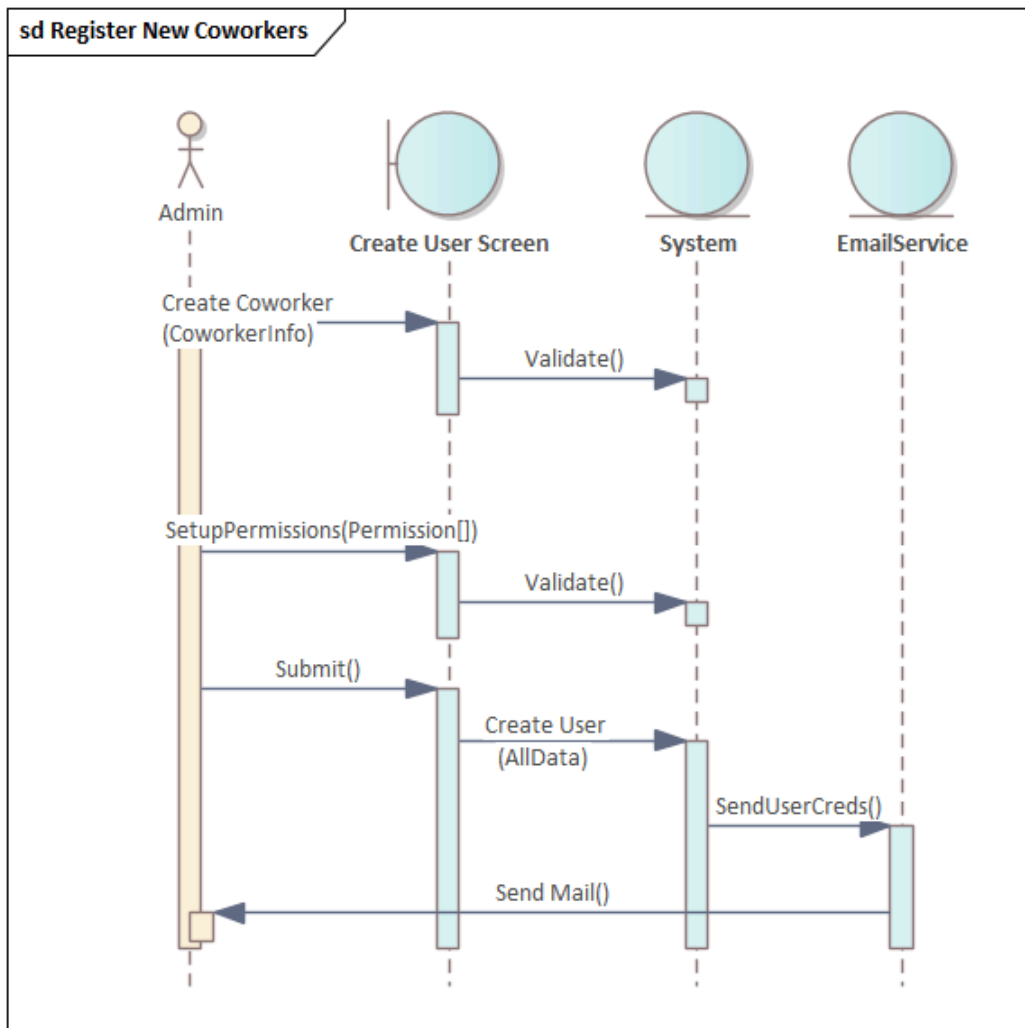


Figure 18: Sequence Diagram of Coworker Registration Process

The diagram describes how different services in would work in implemented application and that will be using to make a succesfull corowker registration.

13.6. Document Approving

Figure 19 represents the activity diagram of the process of document approving.

The Activity diagram describes the process of obtaining a document through a user-initiated request. And then mediated by a system for approval or rejecting.

Initially, the user initiates the process by creating a document request by selecting an available template and providing all necessary information. A system automatically links all relevant documents automatically. Then a system routes this request either for approval to a certain coworker or for insertion into a free pool.

The coworker, upon receiving the request, selects it for approval. He thoroughly examines the provided data and linked documents and decides whether to:

- If the data is deemed correct, the system proceed to generate the requested document.
- If any discrepancies are found, the system sends a notification to the user, explaining the reasons for rejection.

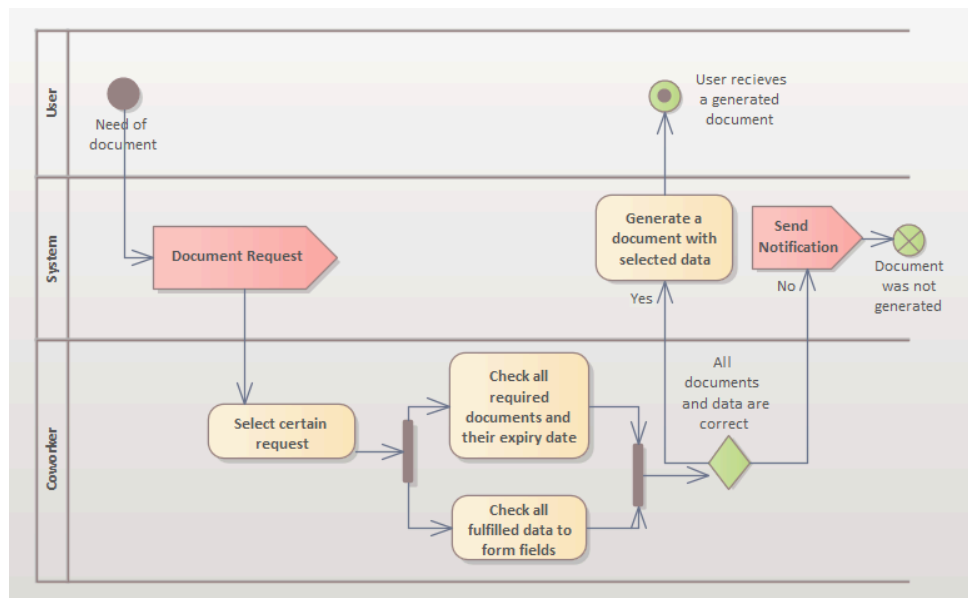


Figure 19: Activity Diagram of Document Approving Process

This activity might be shown also and with sequence diagram, that depicts the intricate process of managing document requests within the system, showcasing the orchestrated interactions between a coworker, the system, a database, and a client.

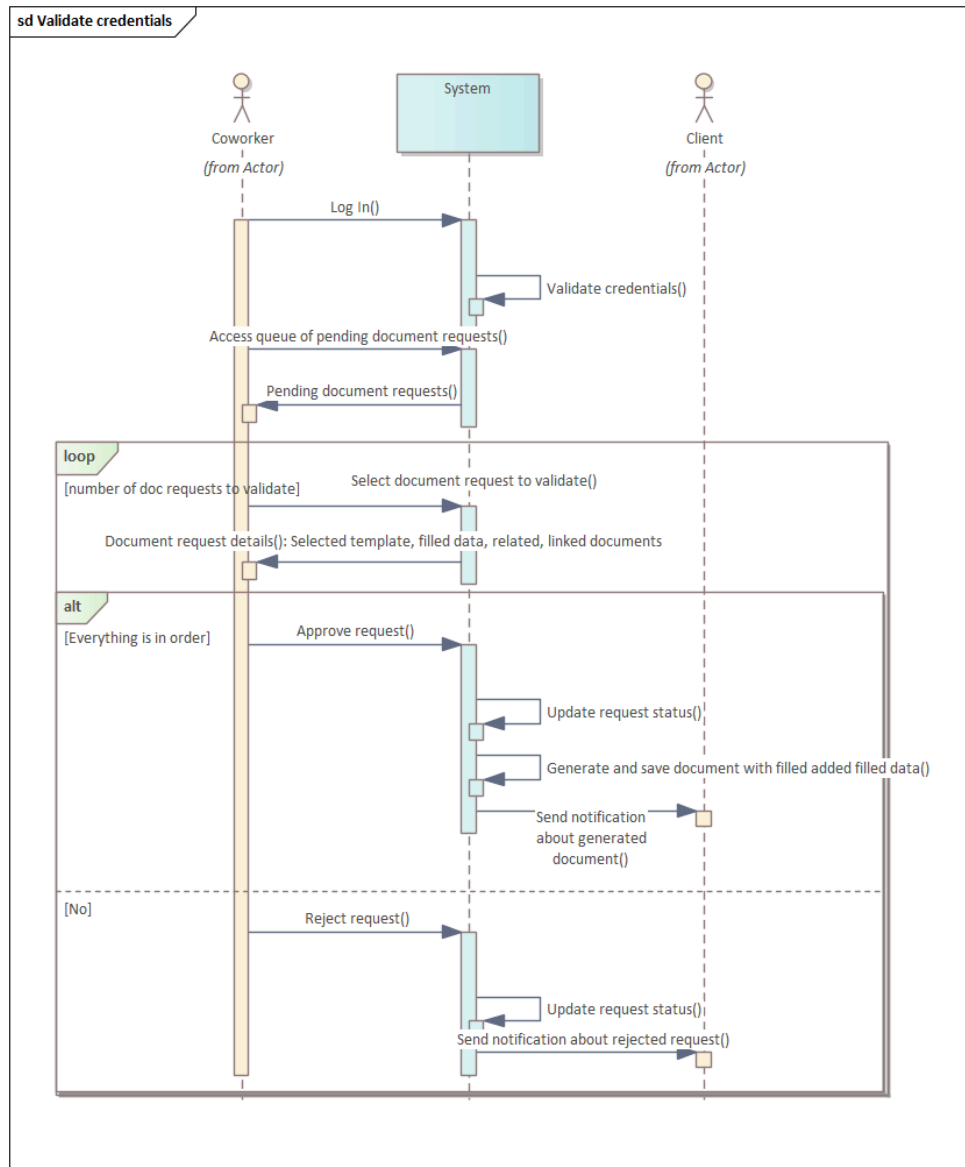


Figure 20: Sequence Diagram of Document Approving Process

Including these supplementary activities alongside the sequence diagram enhances its comprehensiveness, offering a holistic view of the document request management process and the associated system behaviors

14. Use Case Model

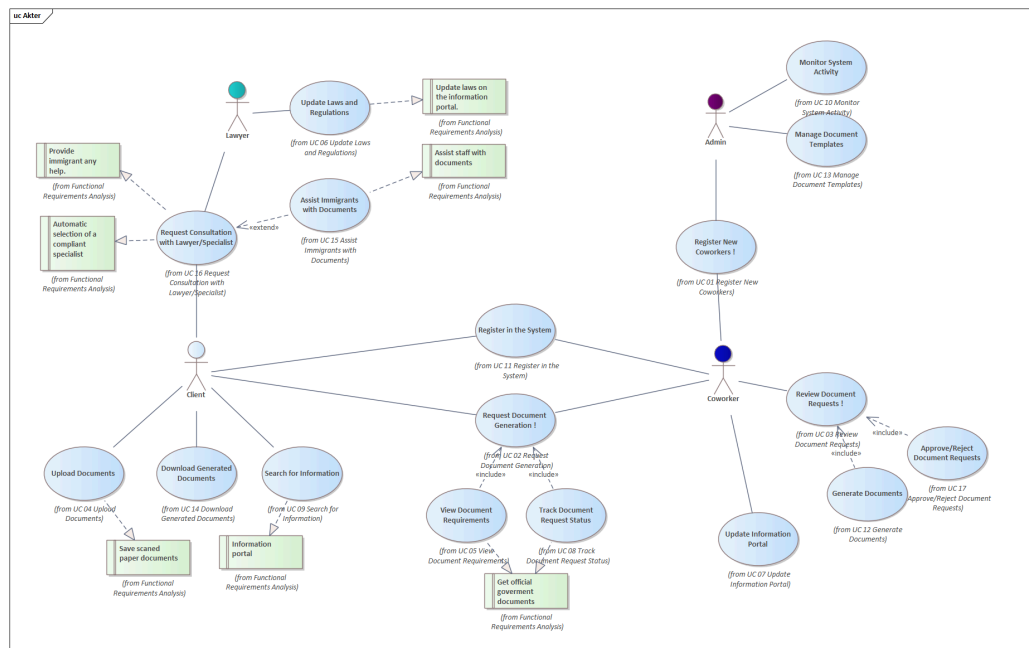


Figure 21: Use Case Model

Figure 21 shows the relationships between the actors and the use cases in the system.

Here is a brief description of the client's use cases:

1. **Register in the System:** Create an account and provide necessary information for verification.
2. **Search for Information:** Find relevant information using keywords or specific criteria.
3. **View Document Requirements:** Access information about required documents for specific processes.
4. **Upload Documents:** Store personal documents securely within the system.
5. **Request Document Generation:** Choose a document template, provide required information, and submit a request.
6. **Track Document Request Status:** View the current status of submitted document requests.
7. **Download Generated Documents:** Access and download completed documents.
9. **Request Consultation with Lawyer/Specialist:** Submit a request for legal guidance or assistance.

The diagram also includes the following use cases for the admin, coworker, and lawyer actors:

Admin:

1. **Register New Coworkers:** Create accounts and set access permissions for government staff.
2. **Manage Document Templates:** Create, modify, and update document templates used for generation.
3. **Monitor System Activity:** Track usage, identify potential issues, and ensure system performance.

Lawyer:

1. **Update Laws and Regulations:** Ensure the information portal reflects current legal information.
2. **Assist Immigrants with Documents:** Provide guidance and support to immigrants regarding document-related processes.

Coworker:

1. **Review Document Requests:** Assess submitted document requests and verify information.
2. **Approve/Reject Document Requests:** Make decisions based on document requirements and user eligibility.
3. **Generate Documents:** Create requested documents using approved templates and user-provided information.
4. **Update Information Portal:** Contribute to the information available on the system with admin approval.

The next thing we wrote 3 scenarios for 3 use cases: Request Document Generation, Review Document Requests, and Register new Coworkers.

Use Case: Request Document Generation (Immigrant/Client)

- **Basic Flow:**

1. The immigrant selects the desired document template from the available options.
2. The system presents the document template with pre-filled information (if available) and highlights any missing fields.
3. The immigrant provides the required information in the missing fields.
4. The immigrant reviews the complete information and submits the document generation request.
5. The system verifies the information and generates the document.
6. The immigrant receives a notification that the document is ready and can download it.

- **Alternate Flow (Missing Required Documents):**

1. After selecting the document template, the system checks for prerequisite documents.
2. The system identifies missing required documents.
3. The system informs the immigrant about the missing documents and provides instructions or resources for obtaining them.
4. The immigrant obtains the necessary documents and restarts the document generation process.

- **Exception Flow (Information Error):**

1. The immigrant provides incorrect or incomplete information in the document request.
2. The system detects the error during verification.
3. The system notifies the immigrant about the specific error and requests correction.
4. The immigrant reviews and corrects the information before resubmitting the request.

Use Case: Review Document Requests (Coworker)

- **Basic Flow:**

1. The coworker logs in to the system and accesses the queue of pending document requests.
2. The coworker selects a document request for review.
3. The system displays the request details, including user information, document type, and any attached documents.
4. The coworker verifies the user's eligibility and the completeness of the information provided.
5. If everything is in order, the coworker approves the request.
6. The system proceeds to generate the document.

- **Alternate Flow (Request Additional Information):**

1. During the review, the coworker identifies missing or unclear information.

2. The coworker sends a message to the immigrant requesting clarification or additional documents.
3. The immigrant provides the necessary information or documents.
4. The coworker reviews the updated information and proceeds with the approval process.

- **Exception Flow (System Error):**

1. While reviewing the request, the system encounters an error, such as a database connection issue.
2. The system displays an error message to the coworker.
3. The coworker reports the error to the system administrator for troubleshooting.
4. The coworker waits for the issue to be resolved before continuing with the review process.

Use Case: Register New Coworkers (Admin)

- **Basic Flow:**

1. The admin accesses the coworker registration section within the system.
2. The admin enters the new coworker's information, including name, role, department, and preferred language.
3. The admin sets access permissions and privileges based on the coworker's role and responsibilities.
4. The system creates a new account for the coworker and generates login credentials.
5. The system sends the login credentials to the coworker's email address.

- **Alternate Flow (Coworker Already Exists):**

1. The admin enters the coworker's information and attempts to register them.
2. The system detects that a coworker with the same information already exists in the system.
3. The system displays a message informing the admin about the existing account.
4. The admin can choose to update the existing account or investigate further if necessary.

- **Exception Flow (Invalid Data Entry):**

1. The admin enters incorrect or incomplete information during the registration process.
2. The system validates the data and detects errors.
3. The system displays specific error messages highlighting the issues with the entered information.
4. The admin corrects the errors and resubmits the registration information.

15. State Machine Diagram

The StateMachine [3] diagram in Sparx Systems Enterprise Architect is a UML Behavioral diagram used to depict the lifecycle phases of an entity, applicable for both technical and non- technical audiences. It's defined for a specific entity and illustrates states, transitions, and other elements. Commonly used in business analysis, it models entities like Bank Accounts or technical systems such as Traffic Light Controls. It can be converted to a State Table Editor for easier manipulation and can generate code for Hardware Description Languages. Various visualization options and filters enhance presentation and understanding, making it a versatile tool for modeling and simulation of dynamic system behavior.

15.1. State Machine Model

Figure 22 contains four different state machines: Client, Document, Template, and Coworker. Each section in the diagram represents a different type of state machine.

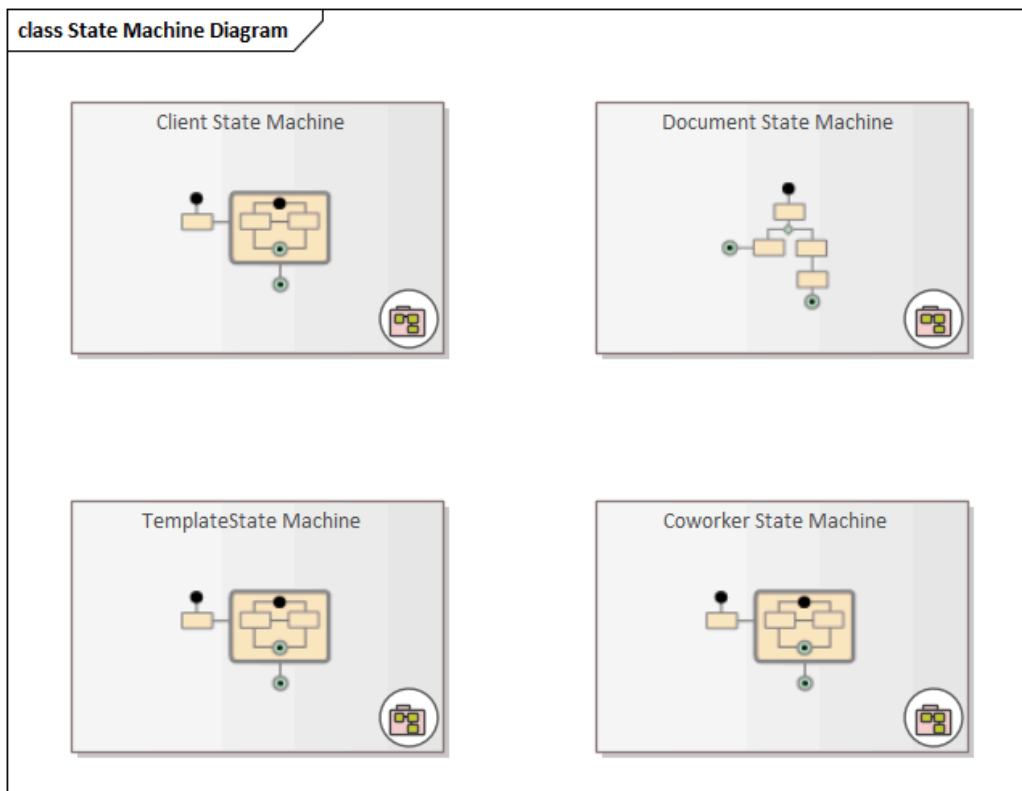


Figure 22: State Machine Diagram

15.2. Client

Figure 23 depicts a state machine for a client. It begins with the “Is Guest” state, where a user can initiate creating an account. If registration is rejected, it goes back to the “Is Guest” state; otherwise, it proceeds to the “Create Account” phase. In this phase, the user fills their profile and uploads personal documents. If all documents are uploaded and accepted, the user becomes a registered client; otherwise, they are rejected and need to re-upload documents or remain in waiting.

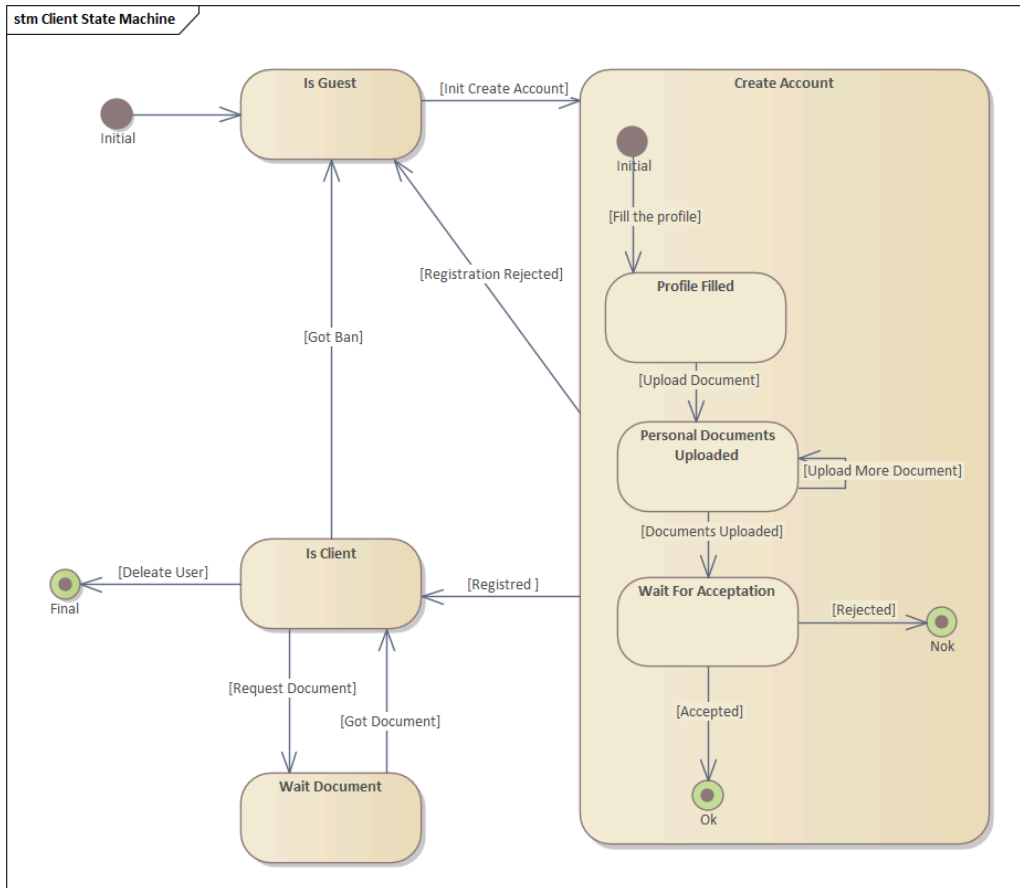


Figure 23: Client State Machine Diagram

15.3. Coworker

Figure 24 starts from an “Empty” state where the registration process is initiated. The process then moves into the “Registration” phase which includes several steps. An admin fills in the new coworker’s personal data, leading to a “Data Filled” state. The admin then selects the coworker’s preferred region, transitioning the state to “Region Selected”. The admin adds the coworker’s credentials and system permissions, and the state becomes “Saved”. The state then transitions to “Is Coworker” and finally reaches the “Document Validation” state.

In parallel to this, there’s a “Region Updated” phase where an admin can move a coworker after updating their region. There’s also an “Is Coworker” verification step that can lead to either firing the coworker or validating the coworker’s document request. After the document validation, the state transitions to “Document Validated” and finally reaches the “Document Validation” state.

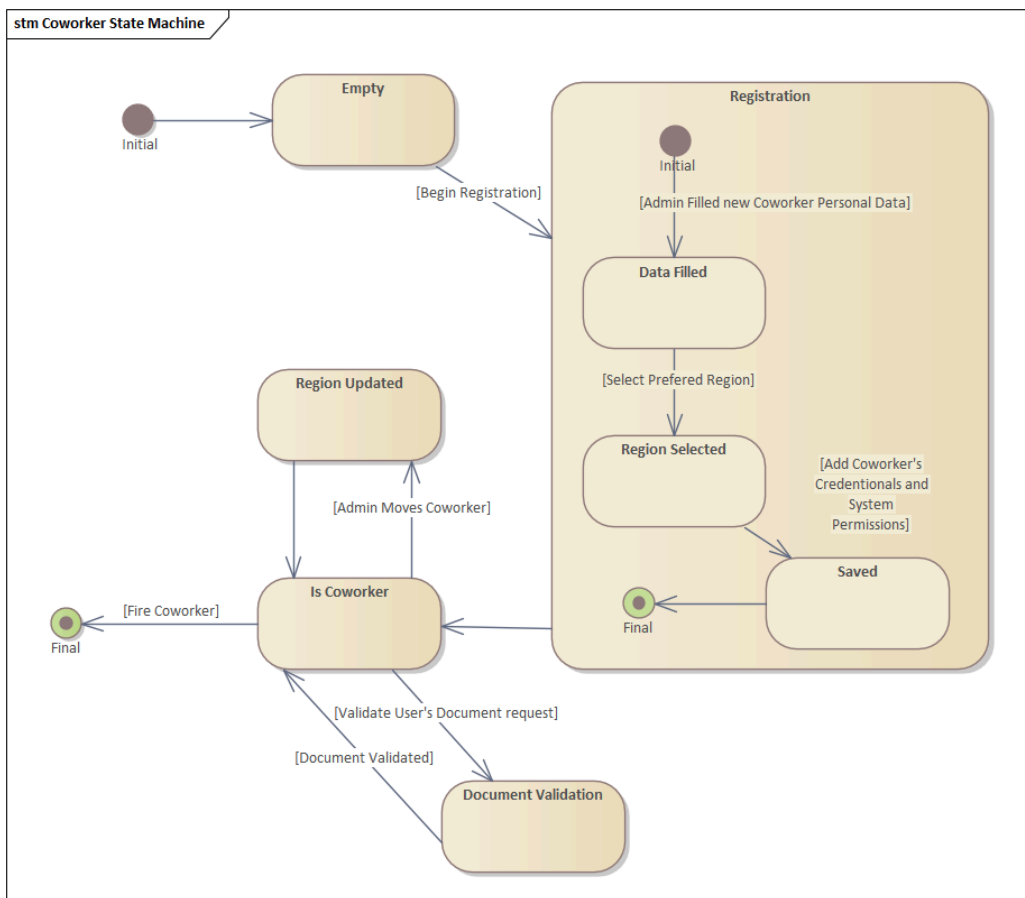


Figure 24: Coworker State Machine Diagram

15.4. Template

Figure 25 starts from an “Empty” state where a template can be uploaded, transitioning the state to “Uploaded”. From the “Uploaded” state, there are two paths. One path leads to “Ready To Use” after requiring updates. The other path begins filling the template. If the template is ready to use, it can be deleted, leading to the “Final” state.

Simultaneously, there’s a “Fill Template” process that starts from an “Initial” state. A template can be updated, transitioning the state to “Updated”. Once the filling is finished, it reaches the final state.

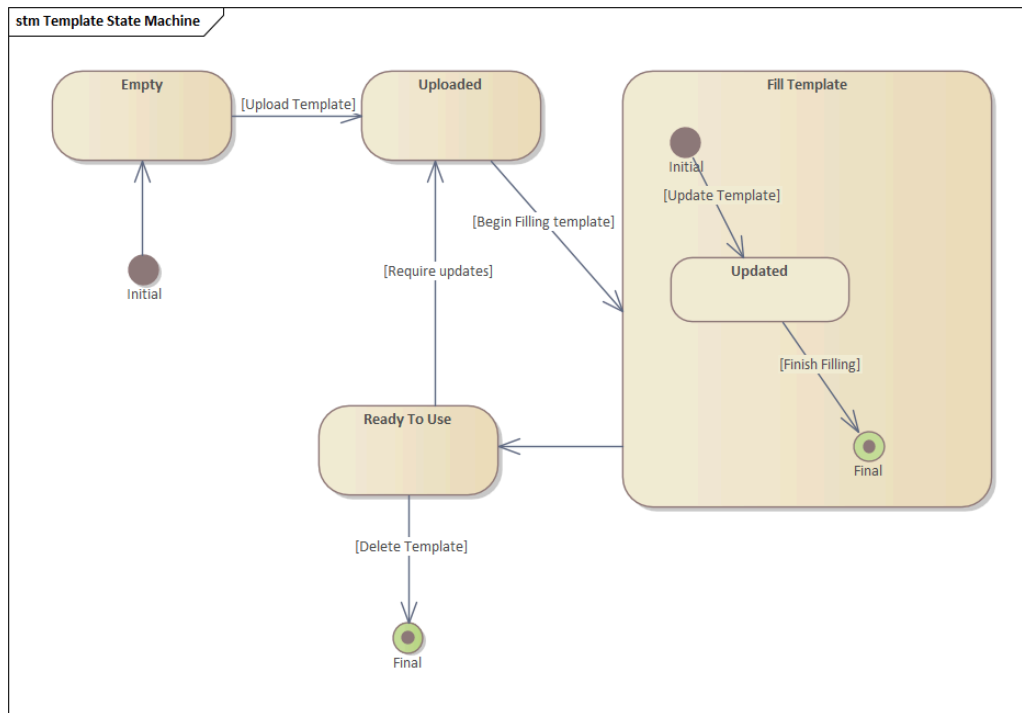


Figure 25: Template State Machine Diagram

15.5. Document

Figure 26 starts from an “Initial” state where a template can be selected, transitioning the state to “Template Selected”. Once the build is finished, it transitions to the “Instance Created” state. Data is then collected and filled into the instance, leading to the “Instance Filled” state. The instance is then submitted to the coworker, transitioning the state to “Pending”. If the instance is rejected, it reaches the “Final” state. If approved, it transitions to the “Generated” state. The generated instance can then be deleted, leading to the final state.

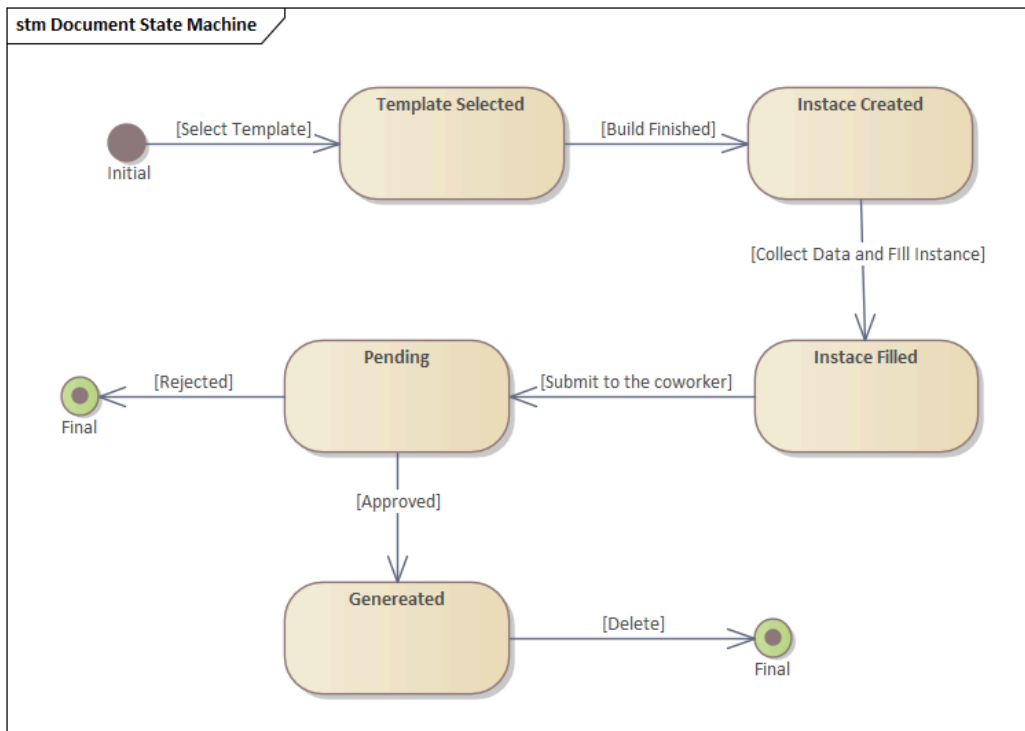


Figure 26: Document State Machine Diagram

16. Wireframes

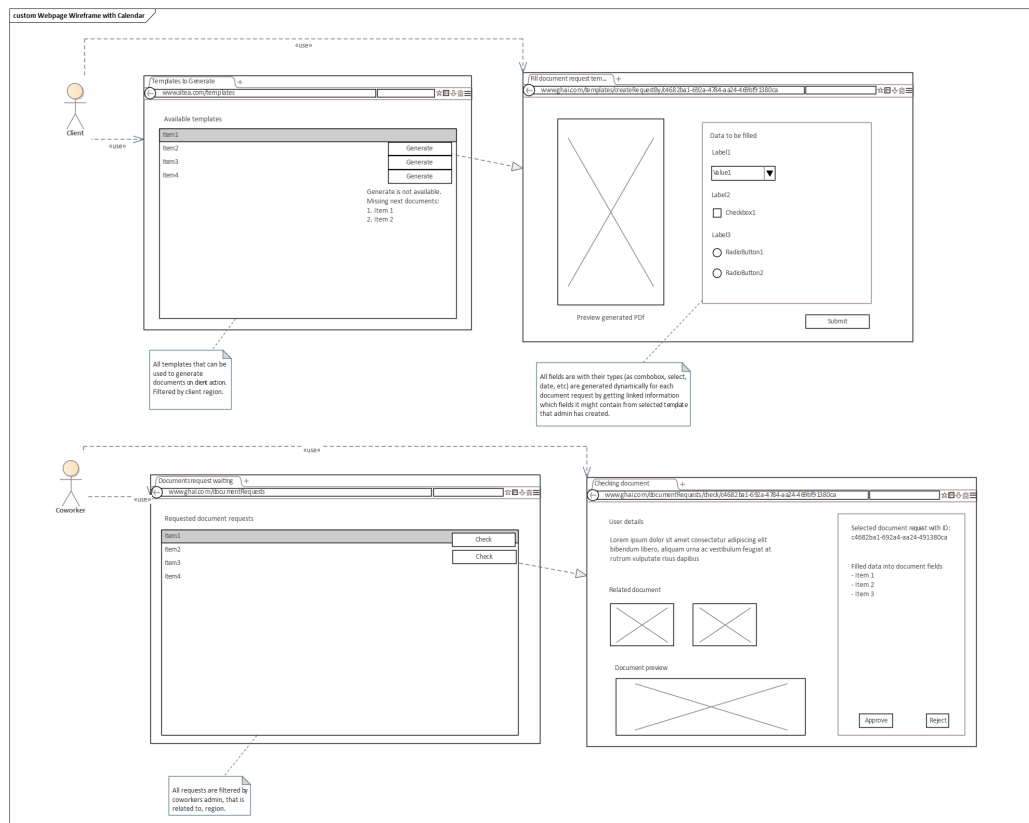


Figure 27: Wireframes

Figure 27 depict the visual representation of the application's interface, we can there see the main screens and their elements. "Templates to generate" screen, "Fill document request form" screen, "Checking the document" screen, and "Documents requests waiting" screen.

Each wireframe provides a detailed view of the layout, components, and interactions within the application, offering a visual guide for the development team to implement the design.

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