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AGILE Development
In
Cloud Computing Environments

WS 2023-24

SERVICE MANAGEMENT COMPONENT

Masters in Engineering
Information Technology

Project Members

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Introduction

This project is positioned to transform the field of IT service requests and provider partnerships by implementing Agile approaches that give priority to flexibility, customer involvement, and iterative development. The article examines the fundamental needs of the Service Management Component, which provides users, also known as Providers, with a safe and customized experience via strong user authentication. It focuses on the changing demands of organizational frameworks. The platform allows Providers to describe specific parameters like required responsibilities and competence levels, while also facilitating a variety of service requests. The platform incorporates real-time tracking, numerous request cycles, and cancellation tools, empowering users and promoting collaborative flexibility while adhering to Agile principles. Continuous client collaboration demonstrates the iterative nature of Agile development and guarantees that platform evolution is in line with organizational needs. The article also looks at integrating APIs, emphasizing the need for interoperability in order to integrate external systems seamlessly and foster a cooperative ecosystem. This paper presents the Service Management Component's dynamic development journey through the lens of Agile principles, highlighting its potential to revolutionize the IT service sector by offering a flexible, user-centric, and cooperative solution.

Agile Methodology & its principles

Agile methodology is an incremental, iterative approach to project management and software development that puts the needs of the client, flexibility, and teamwork first. It was created in reaction to the shortcomings of conventional, plan-driven development processes, with the goal of resolving the issues brought on by project settings that are dynamic and requirements that change quickly. The Agile methodology prioritizes people and their interactions over procedures and equipment, practical solutions over extensive paperwork, client cooperation over contract negotiations, and adapting to change rather than sticking to a schedule.

Key Principles of Agile Methodology:

1. People and Interactions over Processes and Tools: Agile places a strong emphasis on the value of candid communication and teamwork among team members. It acknowledges that cooperation and efficient communication are critical to a project's success.
2. Agile places a higher priority on client cooperation and active involvement throughout the development process than it does on contract negotiation. This guarantees that the product will live up to client expectations and be flexible enough to adjust to new demands.
3. Adapting to Change Rather than Sticking to a Plan: Agile recognizes that changes in project needs and objectives are inevitable. Teams are encouraged to welcome change and modify their plans and tactics as necessary.
4. Creating Incremental Value: The agile methodology divides a project into small,

achievable units known as sprints or iterations. Every iteration yields a product that may be shipped, facilitating ongoing input and enhancement.

5. Frequent Evaluation and Adjustment: Agile includes frequent retrospectives to evaluate the team's performance and pinpoint areas in need of development. Through this ongoing feedback loop, the team can improve and adjust its procedures.
6. Continuous Delivery and Integration: Continuous delivery and integration is a key component of agile development, guaranteeing that software is continuously tested, integrated, and prepared for deployment at any stage of the process.

Kanban is a significant methodology used to establish, manage, and improve knowledge-intensive services inside the Agile framework used to construct the Service Management Component. Well-known for its Lean concepts, Kanban offers a strong workflow management method that promotes continuous improvement, helps visualize work, and maximizes efficiency.

The requirements of this Agile project are carefully deconstructed into user stories, each of which is then given to one or two developers depending on the complexity of the task at hand. The workflow is visually represented by these user stories, which are actively displayed on a Kanban Board. The Kanban Board is a valuable tool for streamlining work delivery among several teams and providing a centralized setting for managing intricate projects with ease.

SCRUM as agile

The Agile Scrum technique was successfully applied in our project to improve software development and project management procedures. Throughout several sprints, the Scrum Master adeptly oversaw team availability and skill sets, converting project requirements into user stories. This methodology facilitated modifications in specifications, guaranteeing versatility and adjustability. The duration of our engineering jobs varied, with some being assigned to shorter sprints for expeditious completion based on competence and time. Clarifying story specifics required many meetings, and our Service Management Component (SMC) needed to integrate with other teams seamlessly in order to exchange data. In addition to managing the product backlog and acting as a bridge between stakeholders and the development team, the Product Owner also doubled as a Scrum Master and played a crucial role in developing user stories. Their participation in daily Scrums was essential for tracking developments, addressing problems, and ensuring effective communication among all team members. The project's success was largely due to this methodical but flexible approach, highlighting the value of Agile Scrum in dynamic project situations.

SQLi 8

We are using SQLi 8 as our main database management system for our project. Specifically crafted to meet the demands of our application, this cutting-edge database platform offers improved performance, dependability, and security features. SQLi 8 enables effective data management and archiving, guaranteeing quick and precise query execution. Because of its strong architecture, which can handle complicated data structures and transactions, it is perfect for managing the various data needs of our service management portal. To prevent data breaches and guarantee data integrity, the

system also has sophisticated security features.

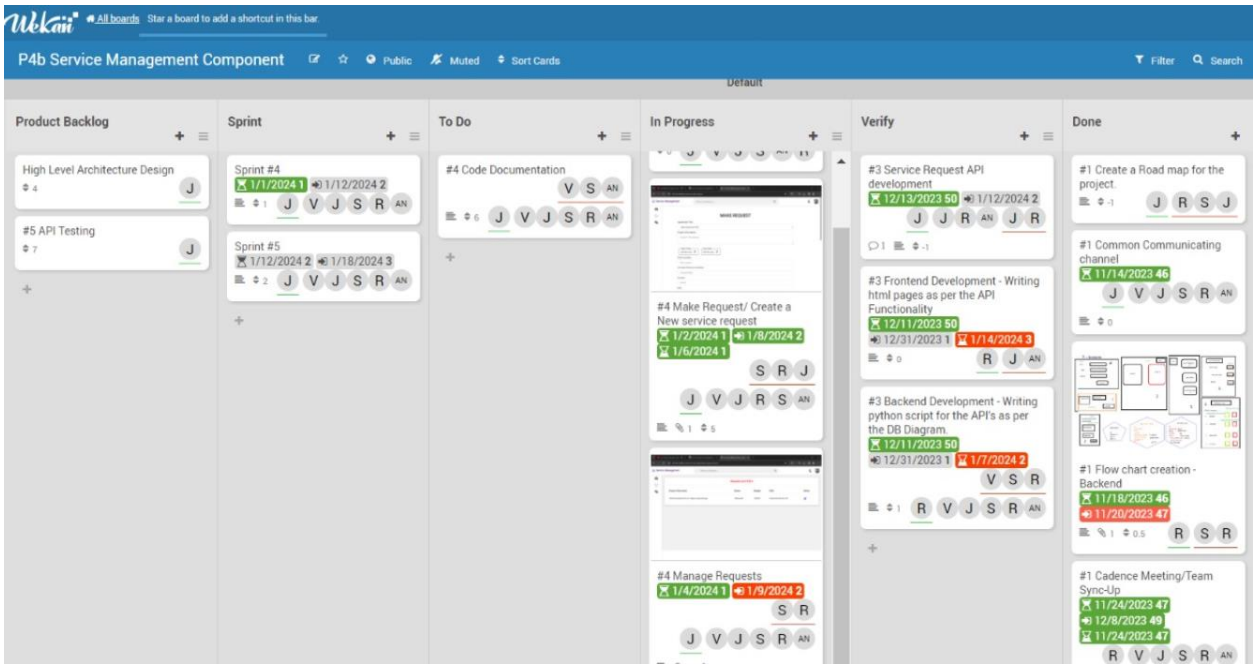
Sprint Planning:

The project was organized into a series of Sprints, each lasting two weeks. Sprint planning was conducted based on the identified user stories. The product backlog was prioritized, and user stories were selected for each Sprint based on their priority and dependencies.

For this project, each group member has followed SCRUM methodology such as:
•Attending Scrum meetings, e.g. Sprint planning, Sprint review and Sprint retrospective
•Choosing agile roles (Product Owner)

Kanban Boards:

Various frameworks are employed in agile projects, and one such framework is Kanban, utilized in the development of the Provider/Service Management Platform. Kanban, a popular Lean workflow management method, aids in defining, managing, and enhancing services for knowledge work delivery. It facilitates the visualization of work, maximizes efficiency, and supports continuous improvement. In Kanban, requirements are broken down into user stories and assigned to developers based on their capacity. These user stories are then depicted on a Kanban Board, enabling the optimization of work delivery across multiple teams and the management of complex projects within a unified environment. Kanban boards were utilized to visualize the progress of tasks within each Sprint. Tasks were represented as cards on the board, moving from "To-Do" to "In Progress" and finally to "Done." This visual representation helped the team to understand the flow of work and identify potential bottlenecks.



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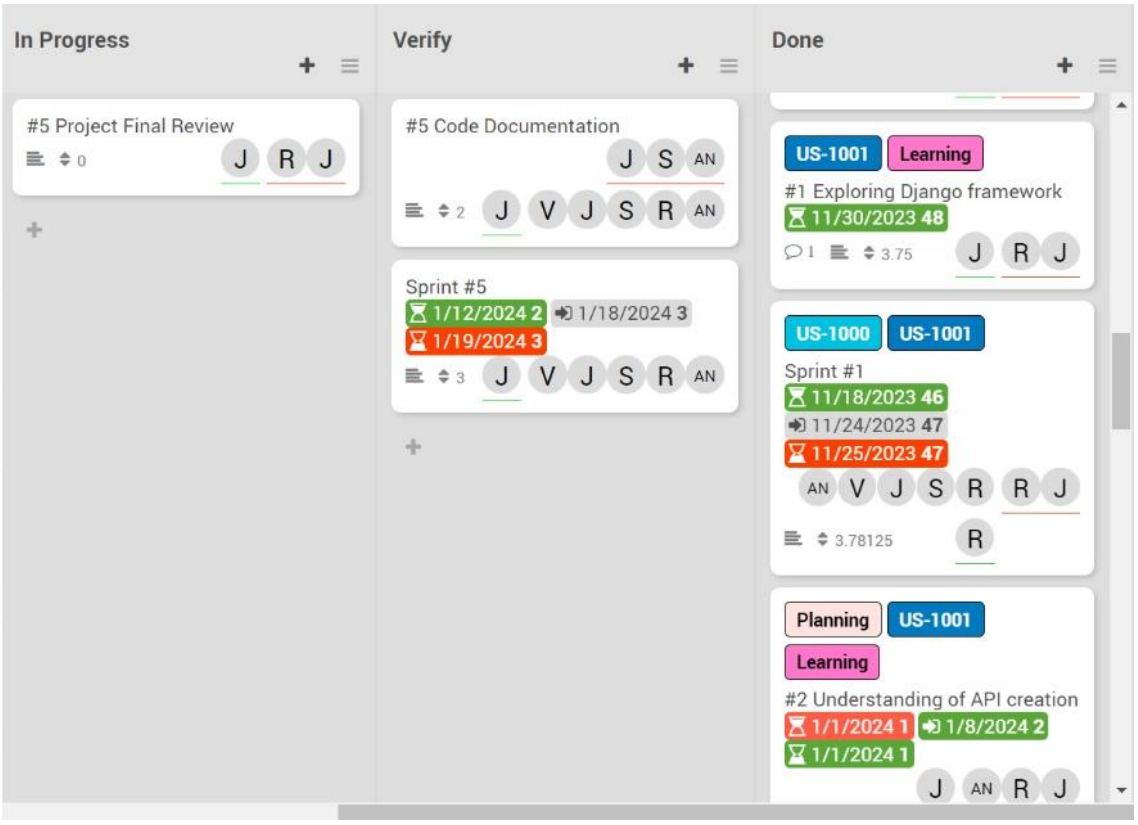

Figure.1. Kanban Board

- Sprint 1 (Length - 2 week)

During the first sprint, the team received information about the technology preferences of the client (Professor Wacht). The initial project requirements were outlined, recognizing the Agile principle that allows for changes and the possibility of certain requirements being moved to the backlog for subsequent sprints. Given the established requirements, the team focused on project planning and selecting the appropriate platform, as the client expressed satisfaction with any coding technology. The requirements were divided into user stories, each with its estimated time, and were then allocated to respective developers. A team member was designated as the Kanban Master to oversee the Kanban board and manage the assignment of user stories. The tasks undertaken during this sprint included the execution of US-1000 and US-1001. For US-1000, the primary focus was on comprehending the requirements, determining the suitable platform, and creating an architecture and project plan. Meanwhile, US-1001 involved discussions related to user stories, where developers were assigned tasks based on their skills, interests, and availability.

- Sprint 2 (Length - 2 week)

During this sprint, the agile methodology played a crucial role, especially as development commenced for the clearly defined requirements. Simultaneously, unclear requirements were presented to the client for additional details. The sprint included the execution of User Stories US-1002 and US-1003. US-1002 concentrated on the login page leading to the Service Management

portal. US-1003 centered around the registration page, where users intending to access the portal needed to register first on this page before utilizing the login page.

- Sprint 3 (Length - 2 weeks)

Following a comprehensive understanding of the requirements, the major portion of the development was executed in this sprint. The focus was on developing the requirements for the Service Management portal, specifically the Master Agreement types and their components. Successful development was achieved for US-1004, US-1005, and US-1006, incorporating connection points linking to other platforms or projects. US-1004 involved the development of the portal's home page, where logged-in users land, and various components are accessible. Integration from the login page to the home page was effectively implemented. In US-1005, the platform was enhanced with the inclusion of master agreement provided from the group 2b, providing information on job availability. For US-1006, Our Service Request Management API development for integrating with external group. Additionally, US-1007 focused on the outcome of Offer table; if selected, a request is extended.

- Sprint 4 (Length - 2 weeks)

This sprint carried out the REST API services. Here integration between two different platforms is carried. Making sure the expected offer details are received and the service request is created for that particular offer. US-1008 and US-1009 was the last bit of development. US-1008: The Offer tables are received and saved in a database and made it available on the service portal. This helps in evaluation of the offers. US-1009: Once the evaluation is carried out, the API offering phase is developed. Also testing was started in parallel for US-1002 and US-1003.

- Sprint 5 (Length - 2 weeks)

During this sprint, the primary focus was on the Testing and Deployment phases, culminating in the finalization of the end product. Rigorous testing, including regression testing on all user stories, was conducted. Deployment was executed utilizing an AWS EC2 instance. The final release of the Service Management portal took place in this sprint, with testing performed on the production environment for all endpoints. Additionally, the team dedicated efforts to document the Service Management Platform.

Scrum Meetings

Regular Scrum meetings were conducted to ensure effective communication and collaboration within the team. Bi-weekly stand-up meetings were held to discuss progress, challenges, and plans for the week. Sprint planning meetings were conducted at the beginning of each Sprint to define goals and tasks. Sprint reviews and retrospectives were held at the end of each Sprint to evaluate the results and identify areas for improvement.

Scrum Roles:

The Scrum roles were clearly defined within the team. The Product Owner was responsible for prioritizing the product backlog and defining the acceptance criteria for user stories. The Scrum Master facilitated the Scrum meetings and ensured that the team adhered to agile principles. The Development Team consisted of individuals responsible for coding, testing, and documentation.

Sprint Review:

The Sprint Review is a crucial Scrum ceremony that occurs at the end of each Sprint. Its primary purpose is to inspect the increment of work produced during the Sprint and to adapt the Product Backlog if necessary.

1. Participants: Team members who worked on the Sprint deliverables.
2. Goal: Review the work completed during the Sprint. Discuss what went well, what could be improved, and any challenges faced. Adapt the Product Backlog based on insights gained during the Sprint.

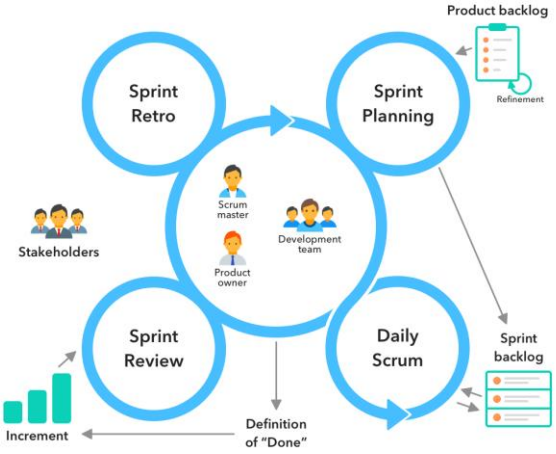

Figure 2. Sprint Planning & Review

3. Review of User Stories: - Each user story included in the Sprint is discussed, highlighting what was achieved and any adjustments made during the Sprint.
4. Retrospective (Discussion of Challenges): - The team discusses any challenges faced during the Sprint, providing insights into what worked well and what needs improvement.
5. Review of Definition of Done (DoD): - Validate that each user story meets the Definition of Done, ensuring the quality of the delivered increment.

The Sprint Review contributes to the inspect-and-adapt cycle, fostering continuous improvement in both the product and the team's processes. The Sprint Review is a collaborative and transparent event that promotes open communication within the team and with stakeholders, ensuring

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that the product remains aligned with the customer's needs and expectations.

Service Management Component(SMC)

The platform is available at: http://13.48.42.106:8000/

Home page

Our homepage greets visitors with a vibrant image, showcasing diverse professionals collaborating on tasks, epitomizing productivity. Seamless login/sign-up options enable users to swiftly access their accounts or register new ones, facilitating efficient entry into our platform. A secure login portal offers administrators dedicated access to oversee platform operations and user management effectively. Our homepage provides a welcoming entry point into our dynamic platform, offering engaging visuals, user-friendly login/sign-up features, and specialized admin access. Whether returning or new, users can swiftly navigate to their accounts or explore platform functionalities, ensuring a seamless and productive user experience.

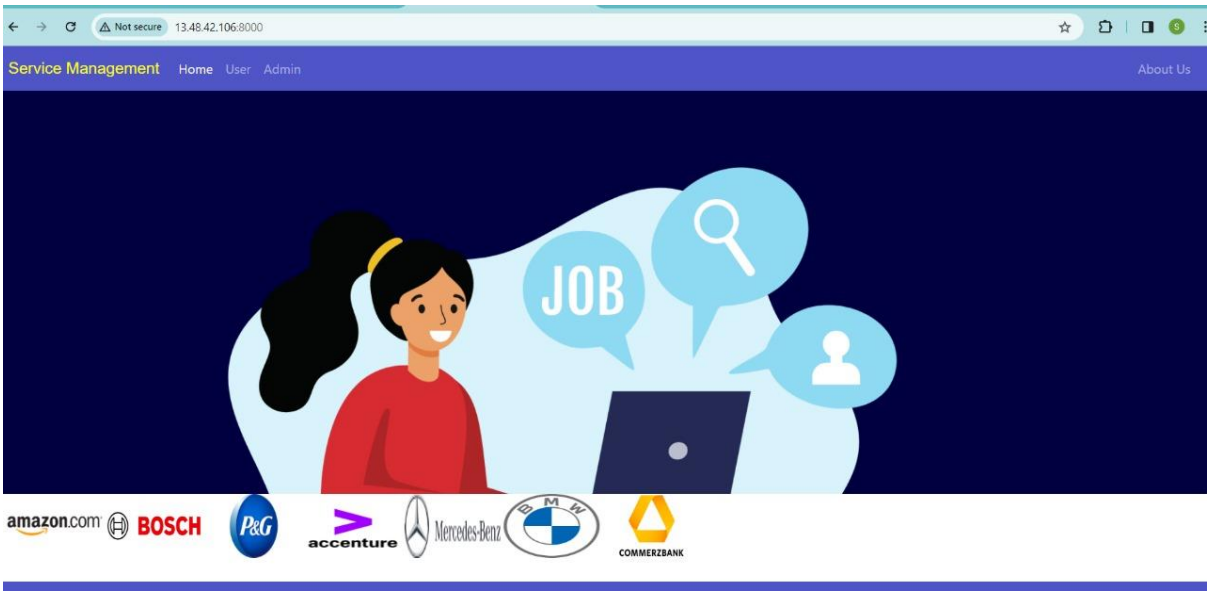

Figure 3. Home page

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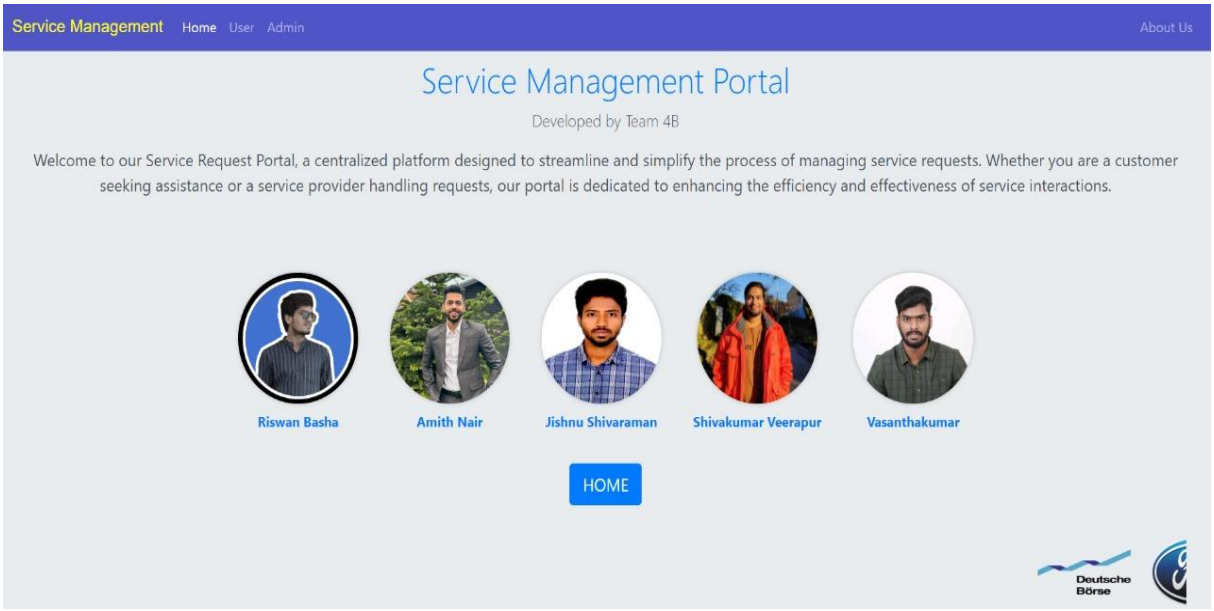
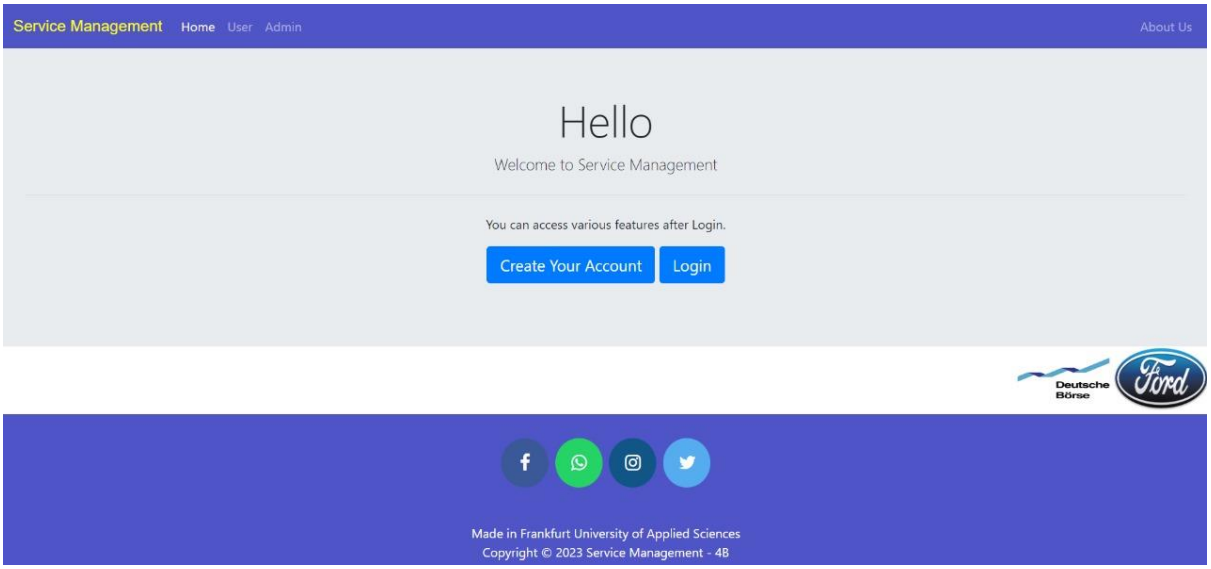


Figure 4. About Us

Customer Signup /Login page

Our sign-up page streamlines registration by prompting users for essential details such as first name, last name, username, mobile number, email, and password, with validation checks ensuring accuracy and it has been integrated from Group 1(http://codexauthv2.onrender.com/api/login/) where if we sign up, automatically it will be saved in their DB as well as our DB. Users agree to our platform's terms before proceeding. Additionally, users can sign up conveniently using social media accounts. For login, users input their credentials, with an option to reset forgotten passwords.



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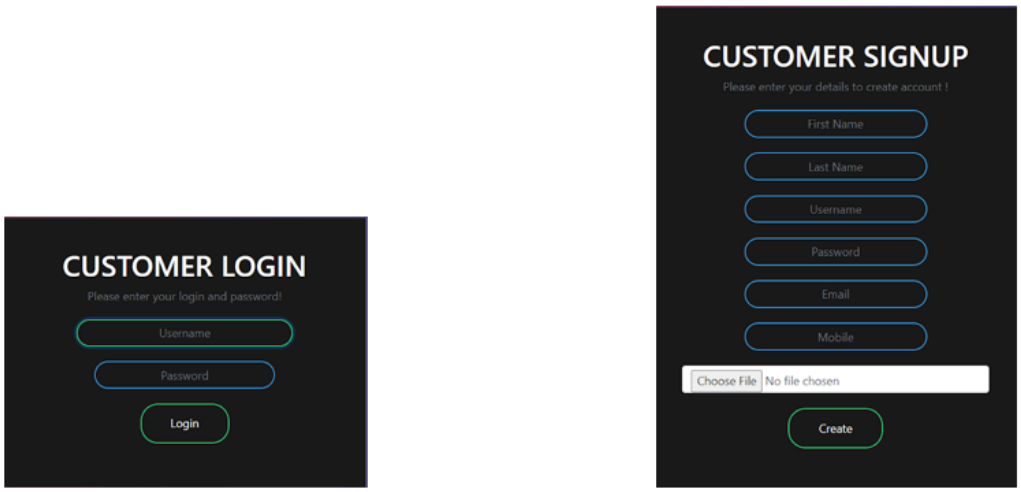


Figure 5. Customer Signup / Customer Login

Dashboard

The dashboard offers users a centralized overview of our job requests, presenting new and completed requests. This user-friendly display keeps users informed about the progress of their job requests, promoting transparency and accountability throughout the service engagement. The dashboard ensures users stay informed and engaged in the job-seeking process by providing timely updates on request statuses, messages from providers, and impending deadlines. This cohesive interface empowers users to manage their job requests effectively, facilitating seamless communication and interaction with service providers.

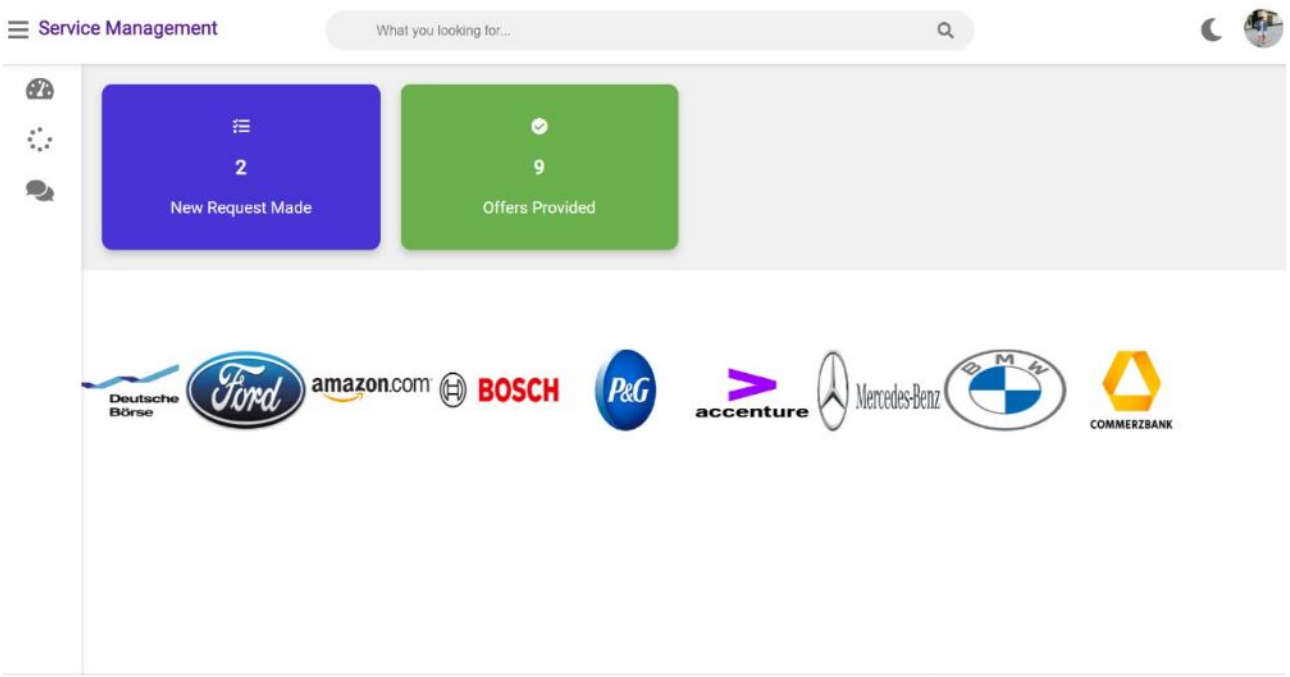


Figure 6. Dashboard

Request

Within our service framework, we facilitate various tasks to ensure operational smoothness, focusing on job requests. Users can initiate job requests, monitor pending ones, and explore available offers. Making a job request involves expressing the need for a specific service, such as hiring personnel or outsourcing tasks. Tracking pending requests provides visibility into ongoing processes, enabling users to stay updated on the progress of their job requests. This feature ensures timely follow-up and resolution. Exploring available offers presents users with opportunities tailored to their job requirements, including budget and job status. This functionality empowers users to make informed decisions, enhancing their job-seeking experience. Our platform streamlines the job request process, offering users transparency, control, and access to beneficial opportunities.

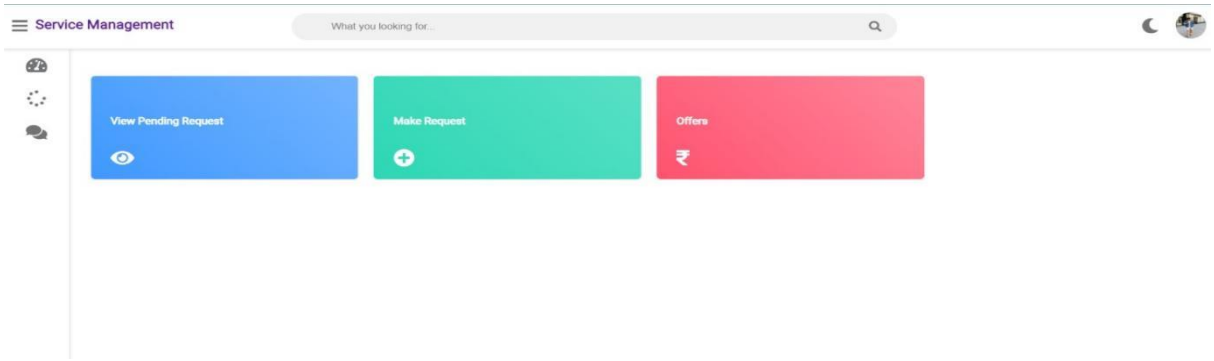


Figure 7. Overview of the request page

- Make Request:

In the "Make Request" section, users meticulously outline their requirements using a structured interface comprising vital fields. Master agreement drop down has been fetched from Group 2B(https://dg4gi3uw0m2xs.cloudfront.net/agreement/). These fields encompass Agreement title, Project details, start and end dates, work location, contract duration, domain, role specification (such as intern, working student, Java developer, or engineer), required experience level (ranging from 0-2 years to 7+ years), Technology expertise, additional skills, resume upload, and allocation of onsite and remote work days. Upon completion, users submit the request, initiating the process and our API will be fetched by Group 3B to post offers(http://13.48.42.106:8000/docs). Subsequently, submitted requests can be accessed and viewed in the "View Pending Request" section, giving users visibility and control over their ongoing requests.

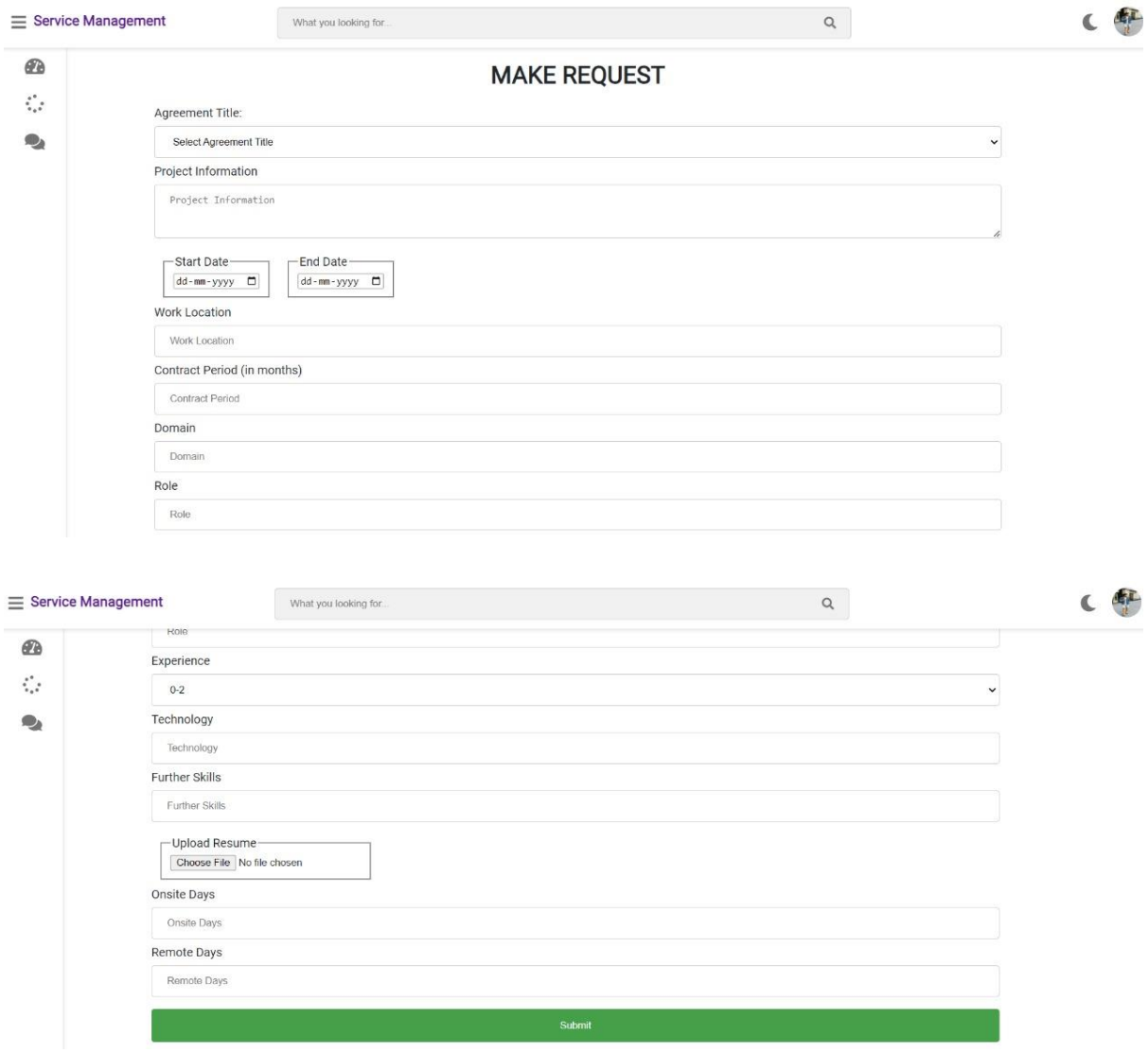
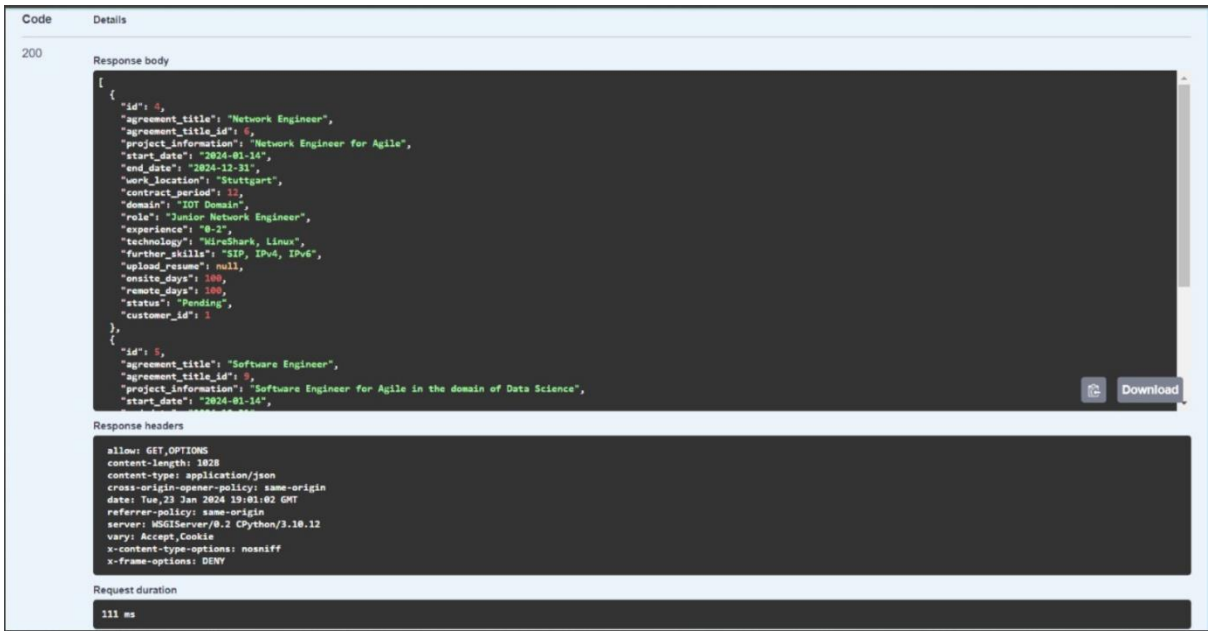


Figure 8. Make Request overview



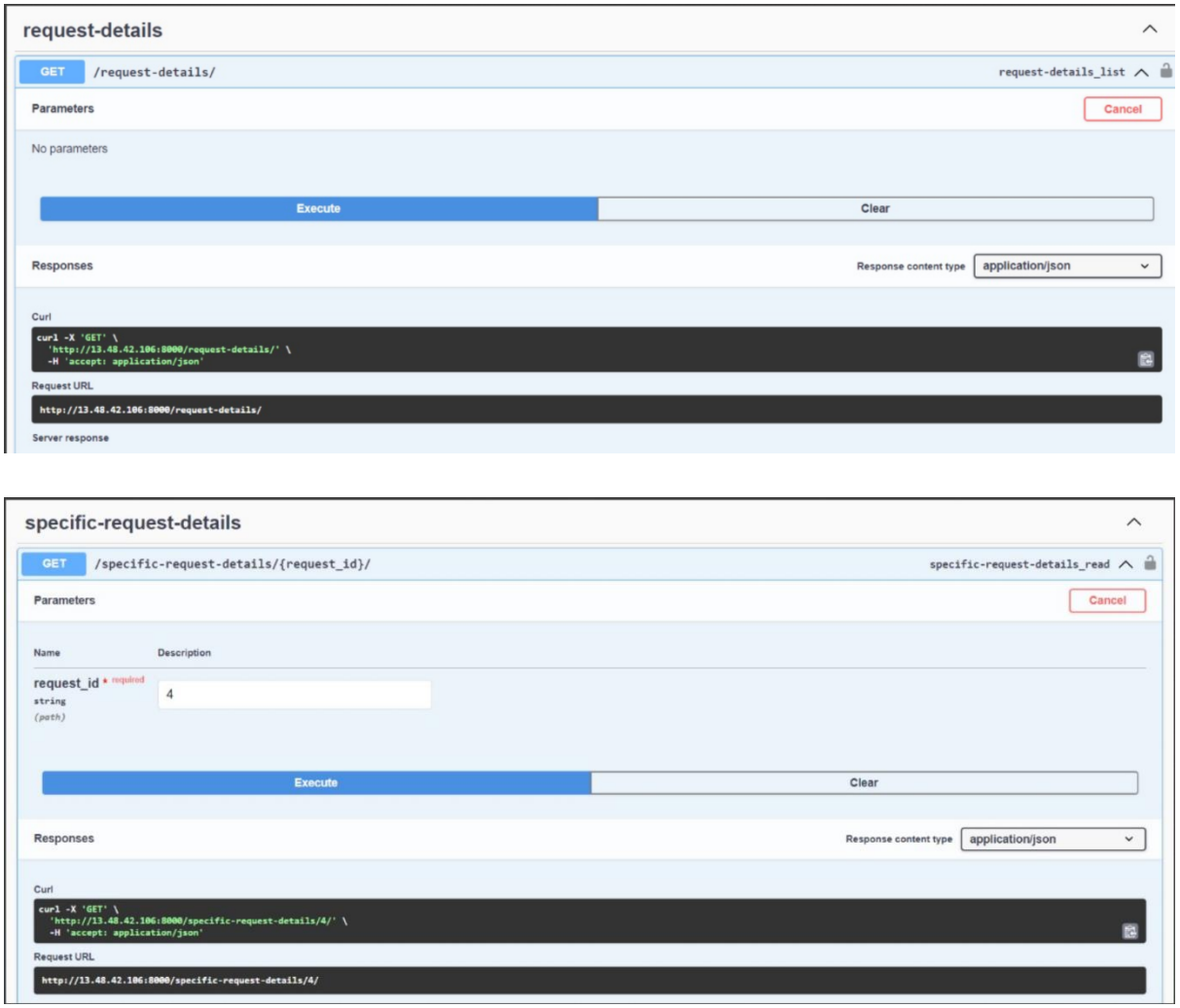


Figure 9. Request Details

- View Pending Request:

Once a customer makes a request, it appears in the "View Pending Request " section, allowing them to monitor its status and verify entered details for accuracy. Customers can delete the request and create a new one with updated information if any adjustments are necessary. This feature ensures that customers can control their requests and make necessary modifications to align with their evolving needs or preferences.

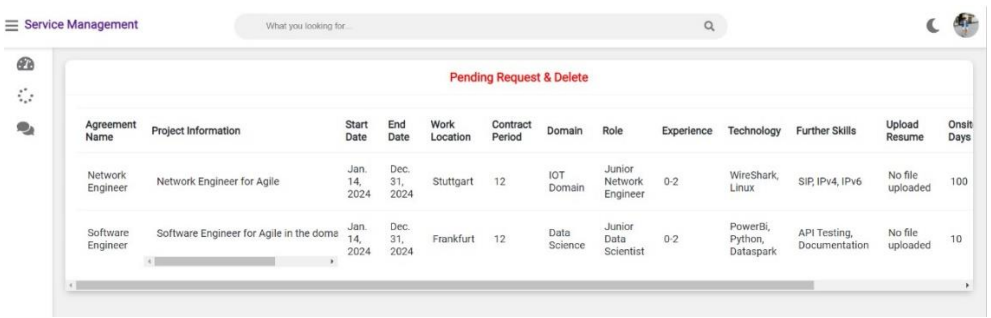


Figure 10. View Pending Request

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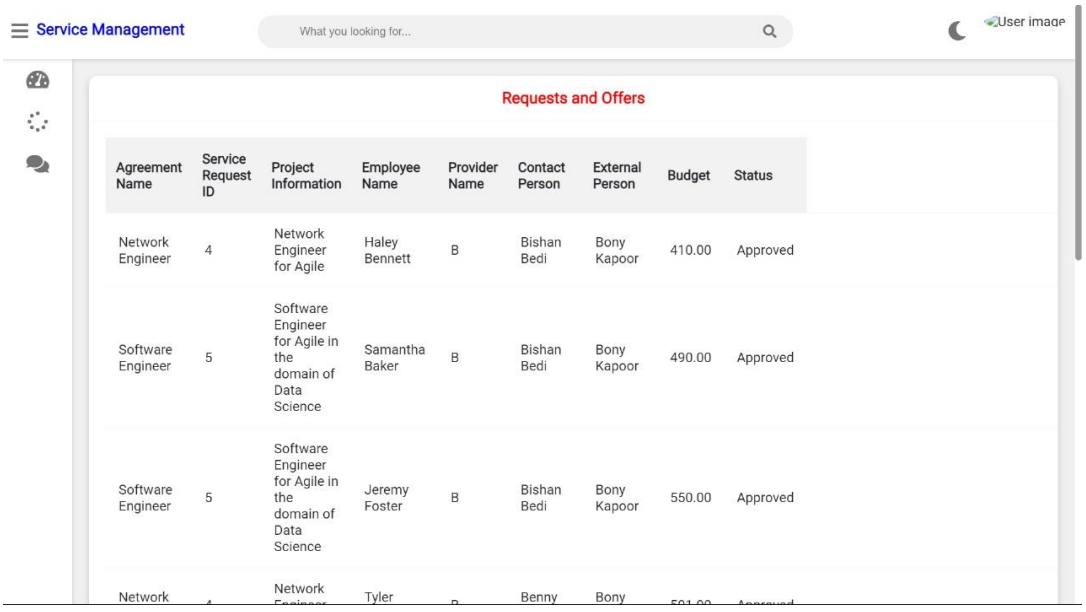
- Cancel/Delete Pending Request:

After a customer submits a request, it becomes visible in the "View Pending Requests" section. This enables them to track its status and review entered details to ensure accuracy. Customers can delete the request and create a new one with updated information if any adjustments are necessary. This feature ensures that customers can control their requests and make necessary modifications to align with their evolving needs or preferences. Deleting a request from the "View Pending Request" section is straightforward. Users select the request they wish to delete and choose the appropriate option. Upon confirmation, the request is removed from the pending list, allowing users to make necessary changes or adjustments. This streamlined approach empowers users to manage their requests efficiently and ensures that only accurate and relevant information remains in the system.

Offers

In the "Offers" section, users can explore opportunities tailored to their job requirements and this has been fetched from Group3b (http://ec2-52-90-1-48.compute-1.amazonaws.com:4000/users/offers?provider=A → Offers API from 3B of provider A , http://ec2-52-90-1-48.compute-1.amazonaws.com:4000/users/offers?provider=B → Offers API from 3B of provider B, http://ec2-52-90-1-48.compute-1.amazonaws.com:4000/users/offers?provider=C → Offers API from 3B of provider C, http://ec2-52-90-1-48.compute-1.amazonaws.com:4000/users/offers?provider=D → Offers API from 3B of provider D). This section presents various offers, including Project information, provider name, contact person, external person, and specialized services, curated to meet users' needs effectively. Users can review each offer comprehensively, considering budget, expertise, and suitability. Additionally, users can provide feedback for declining an offer once it is available, promoting transparency and accountability within the platform. This feature enables users to make informed decisions and select the offers that best align with their requirements and preferences. Overall, the "Offers" section provides users valuable opportunities to enhance their job-seeking experience and secure advantageous deals.



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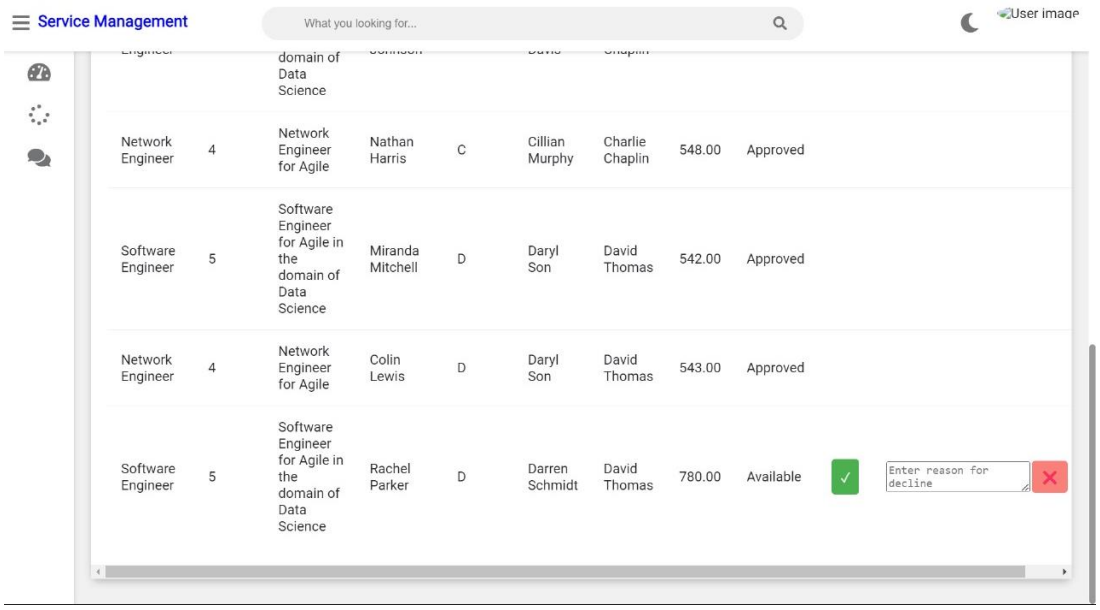

Figure 11. Offers

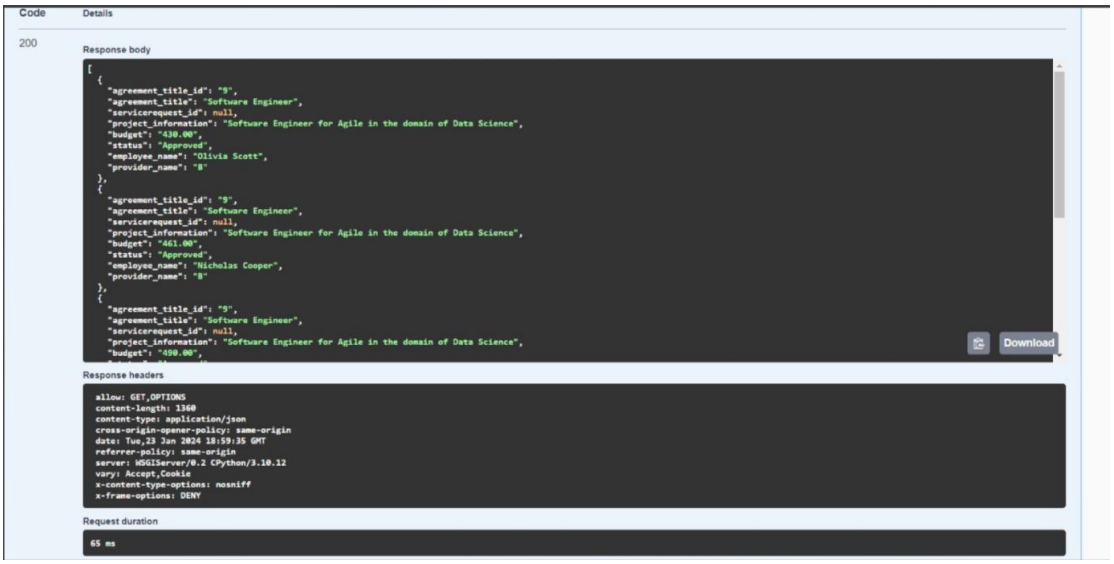

Figure 12. Approved-offers

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Feedback

Within the feedback section, users can provide comprehensive feedback, offering nuanced insights into strengths and areas for improvement. Users can rate individual service providers, enhancing transparency and accountability. Users facilitate constructive dialogue by entering their names and providing reasons for rejecting offers, enabling providers to refine their offerings. Effective articulation of preferences drives service refinement, shaping service quality. This section is a valuable mechanism for users to influence service quality through comments, fostering trust, accountability, and continuous improvement. Ultimately, this collaborative approach enriches the user experience and delivers value to all stakeholders.

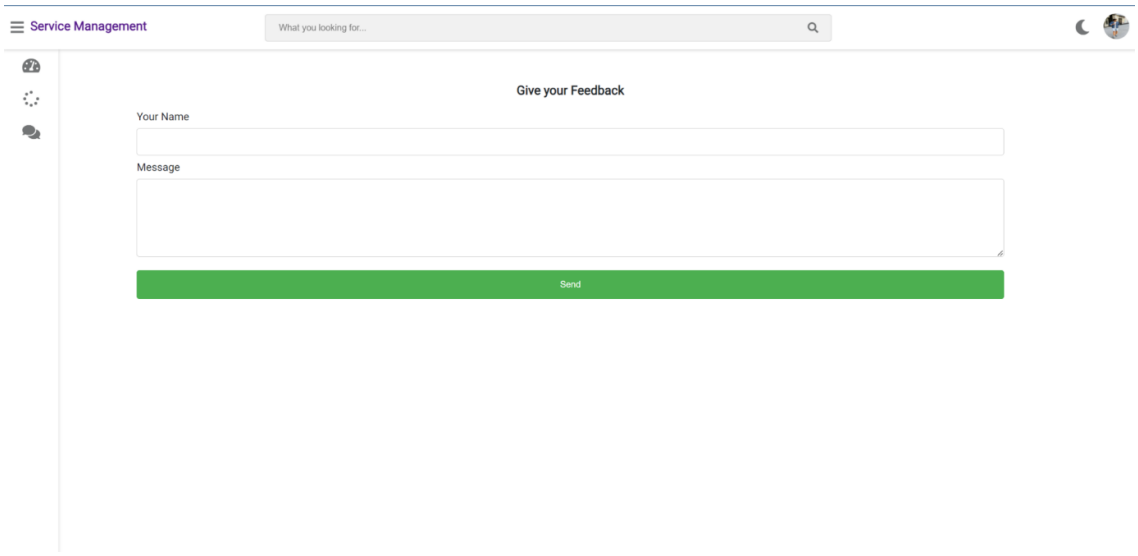


Figure 13. Feedback

Admin Login Page

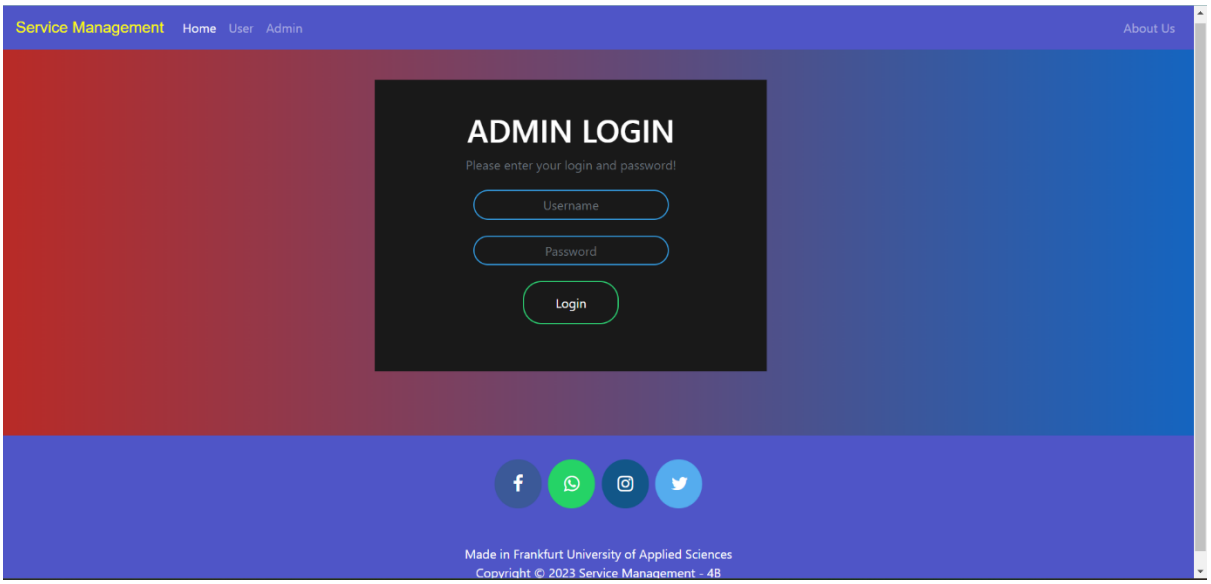


Figure 14. Admin Login Page

The Admin Login page is a secure gateway distinct from the user login, designed specifically for system administrators. Here, admins enter their credentials, which include a username and password, to access the backend of the Service Management platform. This page ensures that sensitive administrative functions and data are securely managed. It's a critical part of the system's security framework, safeguarding the integrity and smooth operation of the service management process.

Dashboard

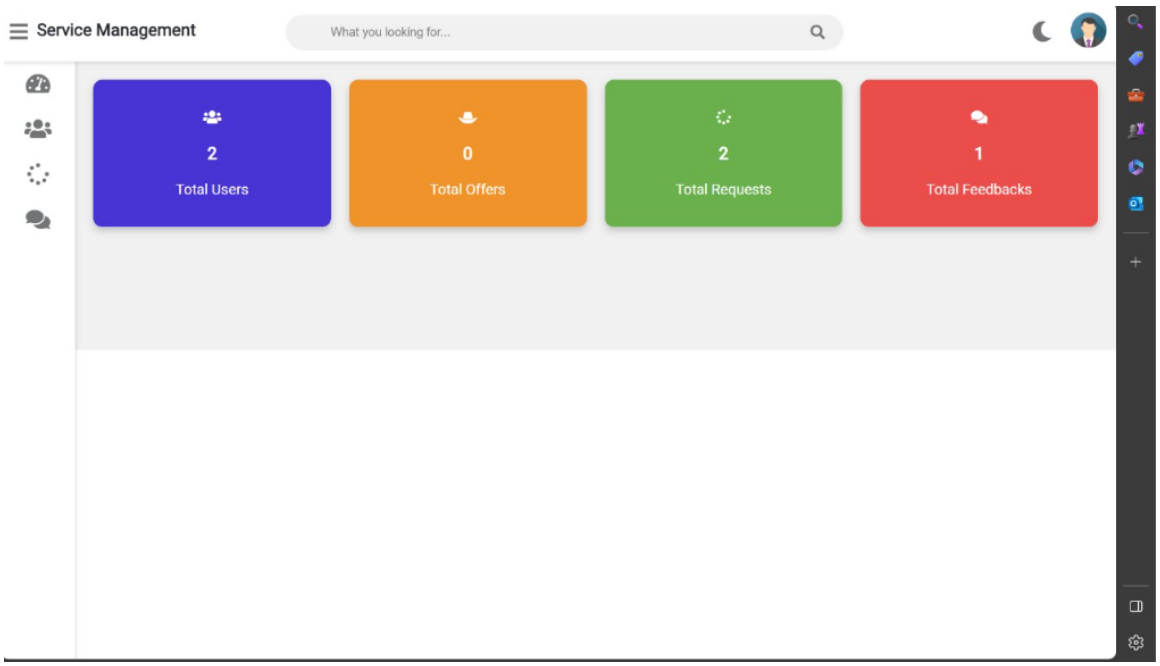
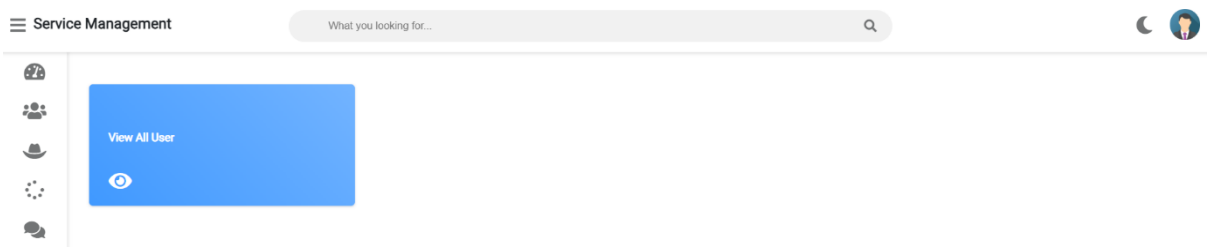


Figure 15. Admin Dashboard

The Service Management Dashboard provides a comprehensive and user-friendly overview of current job-related activities. It displays the total number of users engaged with the platform, current job offers available, the volume of active requests, and ongoing negotiations. This centralized interface enhances user experience by offering clear visibility into the service process, fostering effective communication and efficient management of job requests. By keeping users updated on their service engagement progress, it reinforces transparency and encourages active participation in the job-seeking journey.

View all Users



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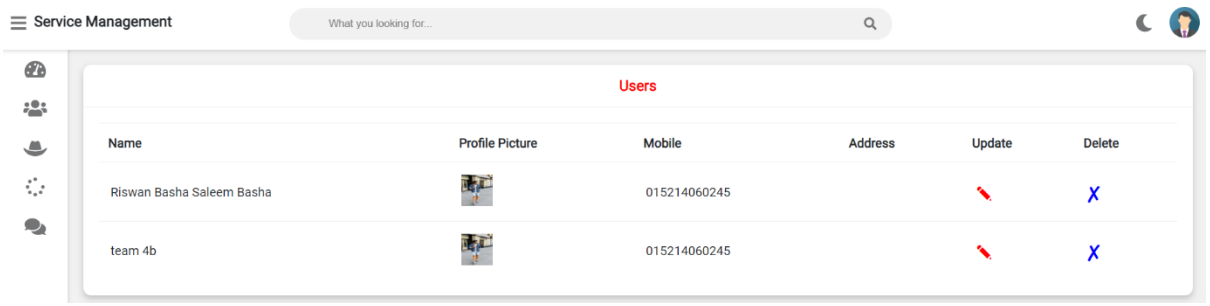

Figure 16. View All Users

The "All Users" section of the Service Management platform is a directory that lists all registered users, offering a snapshot of their profile, contact information, and management options. It facilitates the administration of user accounts, allowing for updates and deletions as necessary. This utility ensures that user information is kept up-to-date and allows for efficient management of user profiles, enhancing the overall system organization and accessibility.

- Update User/Customer:

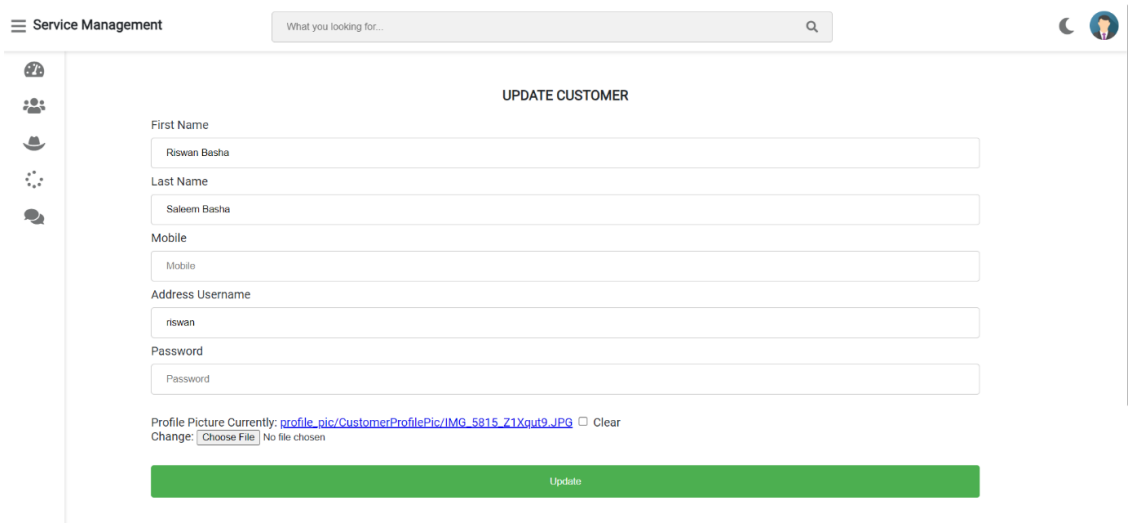

Figure 17. Update user information tab.

The "Update Customer" page in the Service Management system is where an administrator can modify the details of a user's account. This interface presents fields for the first name, last name, mobile number, and address, allowing the admin to maintain up-to-date user records. It also includes a field for the username, password, and an option to update the profile picture. Each change is submitted with an "Update" button, which finalizes the adjustments to the user's profile, ensuring the platform's user information remains current and accurate.

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View all Requests

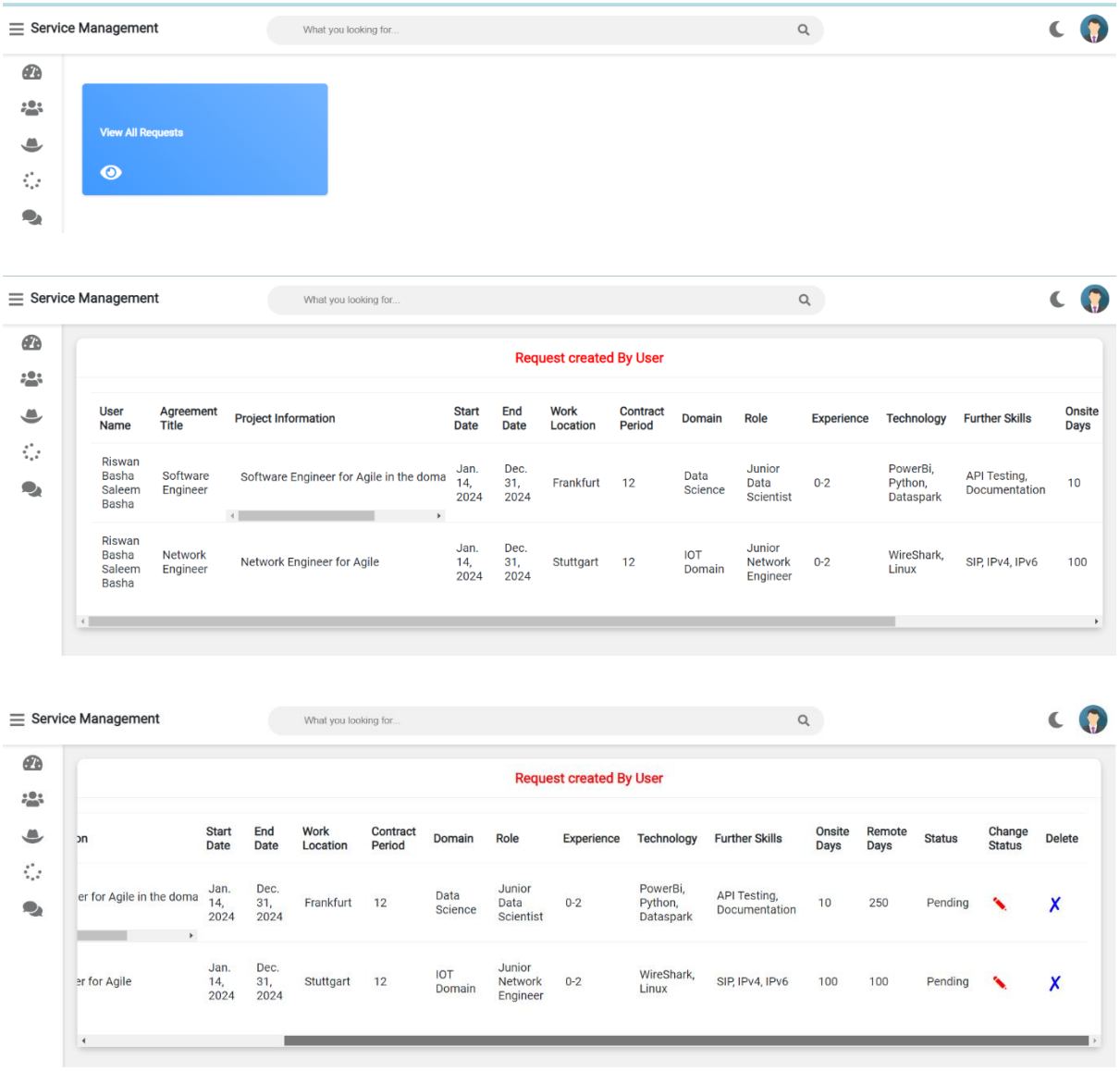

Figure 18. View All Requests

The "All Requests" tab, administered by the system operator, is a comprehensive record of job applications facilitated by the Service Management platform. It presents a detailed array of job requests, including the names of applicants, job titles, and project descriptions, along with crucial engagement details such as start and end dates, work locations, contract lengths, domains of expertise, and defined roles. The tab displays the level of experience required for each job, the specific technologies, and additional skills desired, and the balance of onsite to remote working days. This administrative view is pivotal for monitoring the entire job request lifecycle and ensuring each job match meets the specified criteria and project needs.

- Approve Request or Change Status

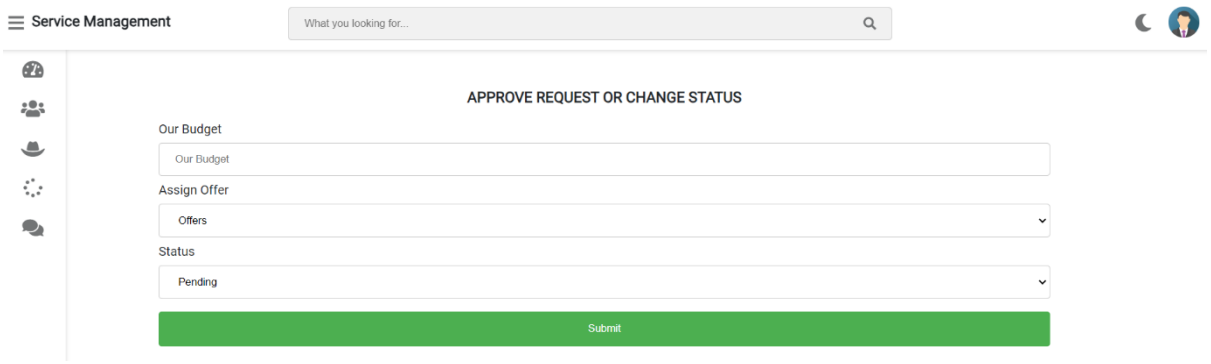

Figure 19. Approve Request or Change Status Tab

The "Approve Request or Change Status" page is an administrative function within the Service Management system, enabling the admin to oversee and adjust the status of job requests. This interface allows for the tailoring of request parameters such as budget allocations and the assignment of specific offers to requests. Additionally, the admin can update the status of a request from 'Pending' to other states like 'Approved', 'In Progress', or 'Completed', which is pivotal in managing the request's lifecycle. Furthermore, this functionality is complemented by the option to delete requests when necessary, ensuring that only current and relevant requests are active within the system.

Feedback Chat

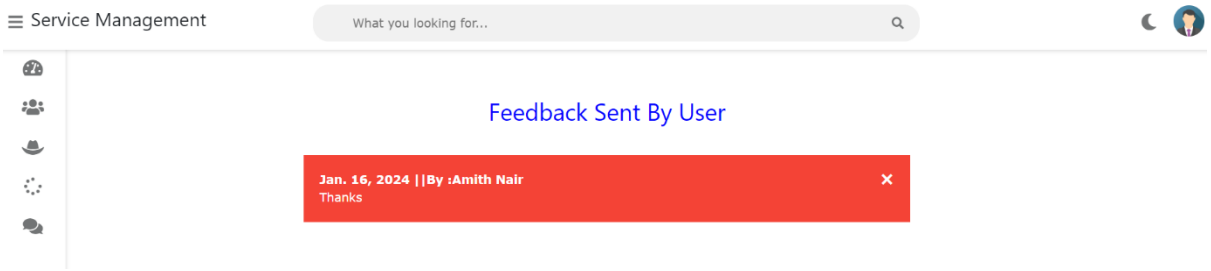

Figure 20. Feedback Chat

The platform's "Feedback Sent By User" section doubles as a communication hub, akin to a chat box, where users can send immediate feedback or messages to the admin following a status update on their request. This interactive feature ensures that users can express their satisfaction, concerns, or negotiate terms directly within the platform, creating a dynamic and responsive environment for service management. The simplicity of the interface, highlighted by the feedback from 'Amith Nair', underscores the system's commitment to user engagement and streamlined administrative communication.

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Deployment

Amazon Web Services (AWS), which combines scalability, resilience, and efficiency, hosts our website. Our website is always dependable and responsive thanks to AWS's cloud architecture, which easily adjusts to different traffic volumes and applications can be published directly from GitHub.. This deployment decision demonstrates our dedication to providing the best possible performance, security, and user experience while utilizing AWS's widely renowned and environmentally responsible platform.

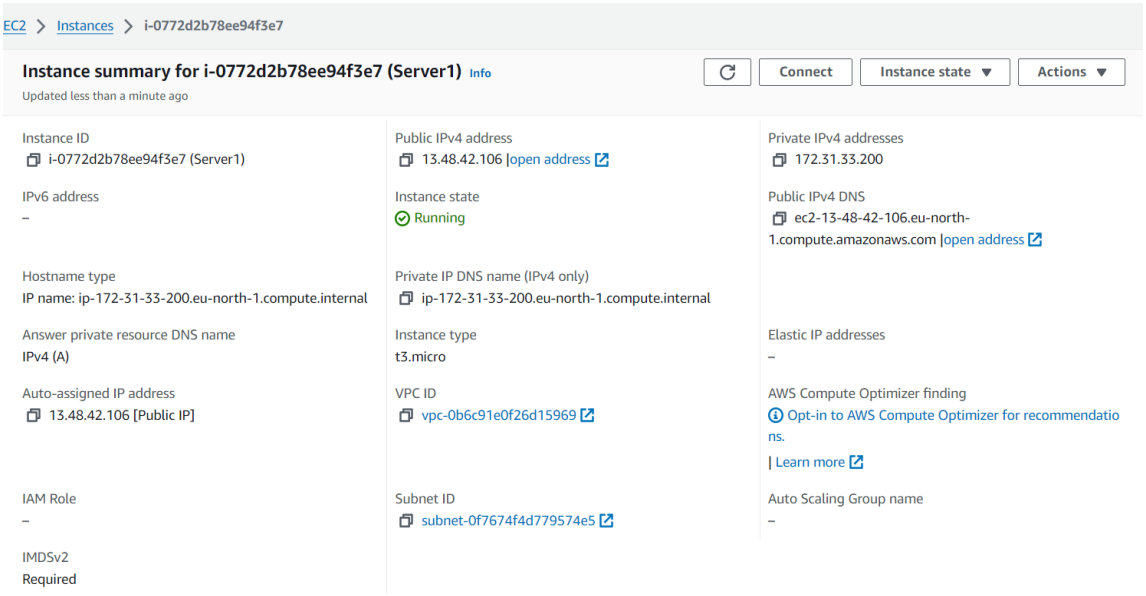

Figure 21. AWS Instance

Conclusion

The report on "AGILE Development In Cloud Computing Environments" presents an in-depth study of the Agile methodology and its application in IT service requests and provider partnerships. It emphasizes flexibility, customer involvement, and iterative development. The report details the Agile principles such as prioritizing people over processes, welcoming change, and delivering incremental value. It also examines the use of Agile frameworks like Kanban and Scrum in project management, highlighting their roles in enhancing efficiency, transparency, and customer satisfaction. The project's journey is narrated through various sprints, showcasing the development of a Service Management Component that integrates real-time tracking, user authentication, and API integration, culminating in a user-centric and flexible solution that revolutionizes the IT service sector.