

ADVANCED PROJECT COLLABORATION TOOL

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ABSTRACT

This paper describes the design and implementation of a Scrum-based project management system that uses contemporary technologies to enhance collaboration, transparency and accountability in software projects. This system combines key features of sprint plans, backlog, task mapping, bug tracking, real time reporting, and provides secure access to appropriate roles of administrators, project managers, developers, testers, and stakeholders. The assistance of integrating any external tools such as Slack and GitHub promotes efficiency and communication with remote teams. Comprehensive system design including architectural perspective, context modeling as well as database schema design has been provided with the help of UML diagrams to increase its understandability. The project shows how agile concepts can easily be applied on a digital managing .

KEYWORDS: *Scrum, Agile methodology, project management, sprint planning, backlog management, task tracking.*

INTRODUCTION

Project management plays an essential role in the current dynamic software market where the key to remaining competitive is speaking up on schedule, using resources efficiently and producing quality. The traditional management methods fail to support the dynamic demands of the contemporary projects, especially those with distributed working teams and involving complex procedures. To address these issues, agile development approaches like Scrum have become quite robust, by facilitating incremental building, and enhanced collaboration, and frequent feedback. Scrum focuses on agility, stakeholder interest, and visibility.

LITERATURE SURVEY

However the Waterfall model and like tend to break down when the project demands frequent

changes. In these systems of high rigidity, as soon as the requirements have been defined, it is generally not very easy and expensive to update them. This has resulted in the necessity of more flexible adaptive techniques.

To overcome this challenge, agile methodologies, particularly, Scrum, was introduced. Scrum offers a platform through which work is further subdivided into small chunks by the use of sprints so that teams are able to release functioning features in phases. Scrum has been greatly studied by the scholars and professionals alike to enhance the cooperation and productive communication and teamwork. The Scrum philosophy is focused on more direct communication, short feedback methods, and the constant iteration to promote future success, unlike the previous methods.

Current project management software tool, like Jira, Trello, and Asana, has demonstrated how software can assist with agile practices. Nevertheless, most of these solutions are restricted by factors such as their exorbitant price, learning curve, or the inability to integrate with 3rd party services. In some studies, it is pointed out that the tools offer task tracking and backlog features, but lack role based security and easy integration with developer tools like GitHub.

To improve this missing piece, it had been suggested that researchers develop systems that would not only provide support to the workflows of the Scrum model, but would also include interfaces of collaboration platforms, reporting dashboards, and secure authentication. The system proposed in this work is the next step of the efforts of the researches reviewed above to introduce the benefits of Scrum to the wider public, along with new technologies to make the system more convenient, inaccessible, and secure to use.

EXISTING WORK

There are several project management tools that have been popular (including Jira, Trello, and Asana) in support of agile and Scrum practices. Features available in these tools include sprint boards, tracking backlog and monitoring progress. Nevertheless, researchers indicate that a number of existing systems are plagued by excessive expenses, inability to make them highly customized, steep learning level, and the lack of interactivity with other external tools such as GitHub or Slack that inhibits the flexibility of the distributed software development teams.

PROPOSED SYSTEM

The suggested system is the Scrum project management system that implements the practices of the agile principle. In contrast to classical project management software, it focuses on ease, security, and integration, and may be used well by both small and large companies, startups, academic projects and by distributed teams.

The heart of the system is the ability to support the most important Scrum features including sprint planning, backlog, assigning of tasks, bugs, and reporting. Project Managers or Owners can create projects, define sprints, distribute tasks and track their completion using intuitive dashboards. Developers and testers can quickly fill in their work, trace the defects, change the status of the activities and indicate their recommendations related to the sprint cycle. Quality assurance is integrated into the process in such a way that any given sprint provides quality and tested results.

The system is characterized by a role-based access control. Administrators are able to customize the entire system, user authentication and access restrictions to allow safe usage. Project managers are dedicated to developing and allocating resources and testers and developers are

dedicated to execution. Customers and stakeholders are given limited access such that they are able to track progress in an open manner without intruding on technical processes in the process.

Moreover, the system can be connected to external systems such as Slack to communicate and GitHub to control the version. Such integrations further actualize the tool to the real-life agile teams that use various services to properly collaborate. A centralised storage of the data would provide consistency in the data, and the secured database authentication would provide safety and responsibility.

Generally, the proposed system can be seen as a system where the features of agile and modern technologies have been united to make the project management process more convenient, collaborative, and streamline. It not only increases productivity but also creates trust and transparency across teams and stakeholders solve most of the setbacks identified in existing systems. The connection between technical departments and customers, and the enhancement of delivery results.

METHODOLOGY

The methodology chosen in the development of the system of Scrum-based project management belongs to the Agile development methodology to keep in line with the principles of the very system. Its cycle is separated into iterative stages, so that features are systematically constructed, tested, and also improved on the basis of feedback.

The initial stage is the requirement collection and analysis where the needs of the various classes of users with regard to the requirements; the administrators, project managers, developers, tester, and clients are captured. This will give confidence that the platform again focuses on the practical workflows and offers user-specific functionalities. Use cases and functional specification are made on the basis of such requirements.

The second stage is on system design and architecture. Both flexibility and scalability is made possible by the use of a modular architecture. The user interface contains safe authentication component, role-based access control, task and sprint manager, bug tracker as well as reporting dashboards. At this stage, external connections to GitHub and Slack are envisaged, as well, to streamline the process of collaboration and communication.

The third phase is that of implementation whereby the modules would be created using modern technologies. All the features, like the creation of backlogs, planning of the sprints, and updating the tasks, are realized as separate, but related modules. Database design has been performed so that it can effectively store and retrieve the project-related information.

Step number four is a test and validation stage. Test scenarios are designed to check technical and non-technical requirements, to bring the system up to the work of both performance and safety parameters, and usability. The feedback of the simulated users is implemented to improve features.

Lastly, the system undergoes deployment and documentation whereby the platform is deployed and the manuals prepared by the user. Feedback and updates are somewhat welcome and that coincides with the agile thought of continuous improvement.

In such a systematic approach, the overall system design that is proposed will not only be technically sound, but also practically suitable to implement agile values, which assure high usability at the project team level.

the numbers of data parts. Such rules as told agreement and data safety were observed throughout the research.

EXPERIMENTAL RESULTS

The system has been examined under the projects in various roles of users provided in a synthetic environment. The results indicated an efficient tracking of sprints, a smooth collaboration and a better visibility to stakeholders. Integration with GitHub and Slack simply worked and richer security arose from role-based access. In general, the platform proved to be reliable, user-friendly, and capable of higher efficiency among teams than current tools.



Fig 2 Home Page

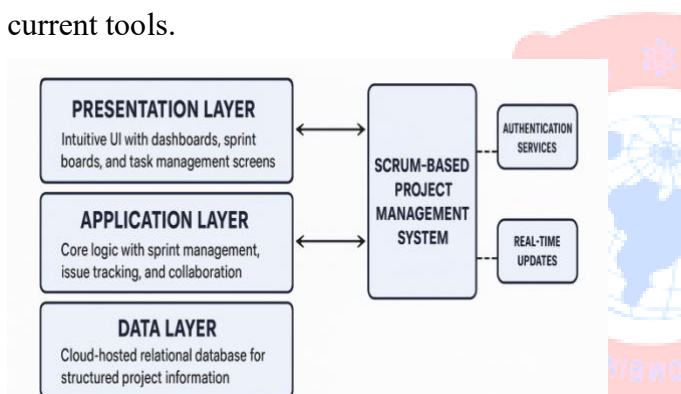


Fig 1 system structure

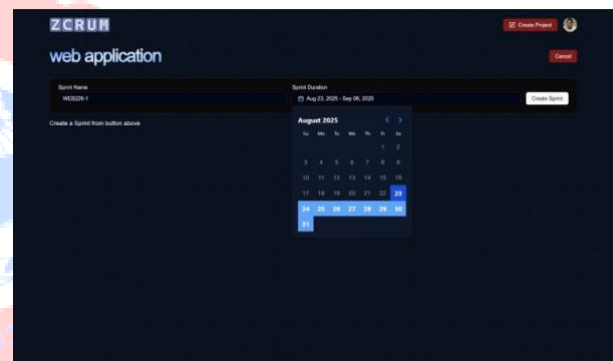


Fig 3 Web Application

The results affirmed an ease of sprint planning, tracking of tasks, and backlog management with little delays. Team collaboration was enhanced a lot with the Slack and GitHub integration, real-time notifications and code transparency. Role-based access ensured that there was a secure environment and at the same time the administrators had total control.

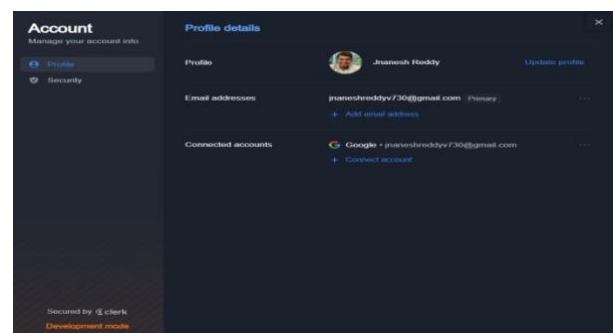


Fig 4 Account Details

CONCLUSION

The Scrum-based project management system created in this work manages to overcome the essential challenges of coordination, transparency, and efficiency in the agile context. The system can improve productivity as it combines key functions like sprint planning, backlog prioritization, task tracking and real-time reporting to make the project run smoothly. Role based access control gives high security and the ability to provide specific functionalities to the administrators, managers, developers, testers, and other stakeholders. Integration with other tools like Slack and GitHub, in its turn, improves collaboration by reducing the number of communication gaps and eliminating the duplication of efforts. The results of the experiments supported the idea that the platform is not only convenient to use but also can be scaled, secured, and adjusted to the needs of real-life projects. The system was better than conventional solutions in terms of usability, transparency of stakeholders, and quicker project tracking. On the whole, the suggested solution can be positioned as a stable, effective, and convenient means of organizing the work of agile projects.

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