Project Management Tool with Kanban Board

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Abstract: *Kanban is one of the important tools as it acts as a central communication hub among the members of an agile development team. In this research, the authors have developed an illustration of a Kanban tool. The tool displays each developer's tasks across the number of horizontal rows. Therefore, users can understand the task assignment and workloads of team members in one go. The board can be linked up with GitHub and support real-time synchronization among clients for distributed development. Observation showed that the proposed approach was effective. Nowadays, startup organizations are facing lots of challenges while using a good kanban application, So the main motive of this project is to provide an effective Kanban application to the client.*

Keywords: *Agile Software Development Methodology, Kanban, Project Management, Synchronization*

I. INTRODUCTION

Kanban is one of the web-based solutions whose focus is on visual management of development. It is a method for managing workflow management of the project at the individual or teamlevel. The name kanban suggests a visual card or signal to the user. The kanban is a great way to start visualizing anyone's work. Many workflow management techniques are available but are not efficient in managing changes and complex work in the project, where the main task can be divided into multiple sub-tasks. In this scheme, the kanban application manages the Software development life cycle(SDLC) efficaciously. In short, Kanban is a visual system for managing task as it moves through a process. Kanban visualizes both the process (the workflow) and the real work passing through that process. The motive of the Kanban tool is to identify potential tailbacks in any process and fix them so the work can flow through it cost-effectively at an optimal rate or throughput. There are many benefits of using Kanban boards over legacy systems like visuals, flexibility in teamwork, and maintaining collaboration among team members. If anyone wants the information in the project then kanban allows to get that information quickly so, Kanban offers a better understanding and analysis of information.

II. PROBLEM STATEMENT

The main challenges faced by small-scale businesses and startup companies are how effectively and efficiently they can streamline their work process and improve their workflow. In the market, the price of Kanban tools varies according to their functionality. Some of the best kanban Software Solutions are quite Costly. The main purpose of this project is to develop a robust project management software tool at an effective cost.

III. APPROACHES

There are many ways to implement the Kanban board, in earlier days normal boards were used. Nowadays, we use proper software for it. For example Asana with boards, DevOps Server, CA technologies, and many more. The biggest problem with a Kanban tool can be the people involved in it don't understand what it is. It requires some time and effort to be understood clearly. So, It becomes really important to come up with an easier understanding of the tool. This project mainly focuses on how to simplify and make it easier for people to understand and use it. The Technologies used are web app technologies. Also for start-ups, this project can be less costly as compared to others.

Use of Kanban in Software Development:
The Lean And Kanban methodology of manufacturing was first introduced by Toyota during the 1950s. Taiichi Ohno's book: Toyota Production System: Beyond Large-Scale Production, has mentioned various basic principles like customer adaptation, lean manufacturing, and continuous development. But these things are examples of manufacturing, with no relation to software engineering. But what is the need for a project management tool? Project management tools help an individual/team in organizing and managing their workload/task effectively.

Kanban project management methodology is mainly adopted in the agile and DevOps software development life cycle. Toyota Production was the first to introduce us to the term Kanban. The word "kanban" can be broken down as "Kan" which means visual and "ban" which means aboard. Kanban View is a visual summary of all the tasks or kanban cards in a list view. It gives us a big picture view of all the work and lets us sort, summarizes, filter or drag and drops the task along the pipeline or workflow. Kanban board is a well-known framework in agile project management tool designed to visual work, Work In Progress(WIP) limits and how to achieve maximum efficient performance as well as helps the team members to be on the same page. The Five important elements of a Kanban Board are:

1) Visual Card.

2) Columns

3) Work in Progress limit(WIP) 4)Commitment Point 5)Delivery Point

1. Visual card: The first step is to divide our work into tasks. Write each of them on a card. Each task is encapsulated as a card, which can be moved across the workflow as they are put in the backlog, workedupon, and completed. These cards/sticky notes move through the workflow and demonstrate progress and help teammates to understand what's going on.

2. Columns: Each column in a Kanban board represents a particular activity. The collection of all these activities forms a "workflow".Cards Flow through these workflowsuntil they reach the final stage. Workflow can be simple as consisting of only "backlog" "Work in progress" "Coding" and "Complete" and also can be much more complex. The card placed at the top of the column(which has the most priority) is taken first and its card is moved to the next column.

3. WIP limits: WIP limits point out the areas of idleness or overload(work in progress or work done simultaneously) at every stage of production. It helps the team see cards in the entire process and main attention to how to get rid of tasks that are causing a bottleneck in the workflow and minimizing flow.

4. Commitment point: Kanban board has a Backlog column in their board that consists of ideasfor the project brought by the client, and stakeholders. The point where the team picks ups tasks from backlog to work on is called the commitment point.

5. Delivery Point: It indicates the end of the workflow. The card that flows through the workflow hascome to an end and the final product is delivered to the client. The team always works to decrease the time between the commitment point to the delivery point.

IV. PRIOR WORK

The first idea of the kanban board came in 1940 by Toyota for boosting the company's efficiency. After that Kanban boards were started being used by supermarkets, and in stock-related places. The kanban in its starting phase was very simple, User only deals with simple cards, it is based on process, pending, completed, and next task mechanism. Since then, Kanban boards have become more important in agile methodology. As time went on, it started being used in IT, software development, Research and Development, and many other commercial fields. The kanban started with three column board and with time it become a more complex, functional, and featured system. Now different kanban tools are available to deal with types of teams, projects, and fields. As software development improved, the new features are added in kanban functionality like drag and drop of tickets, security, version control support, API support, and database.

V. FLOW DIAGRAM

The kanban board contains different tasks visualized in form of notes or stickers on the window of the machine. Every task or note has its life cycle like a new task, pending and completed. Whenever the project manager creates a new task it is automatically added to the new section where the project manager needs to add the priority of the task according to the priority developers and a team member will work on that particular task. While working on that task it will move to the pending stage of the task life cycle. Kanboard allows the scheduler to add, delete, edit and update the tasks this is the flexibility provided by the kanban application. Once the team or developer completed their work on the task it will be ready for deployment and after deployment, the task will go to the completed stage of the task life cycle. This complete flow of kanban application leads to a healthy and managed development life cycle. In short, the kanban board start with login and

authentication check the user and gives him privileges according to his position. Then actual kanban board with three columns will generated where the user can do task management. The user has CRUD privileges to apply it to tickets or tasks. The data generated by the user will be stored on the server for concurrent and remote access. After the completion of the project, the board is able to delete the data.
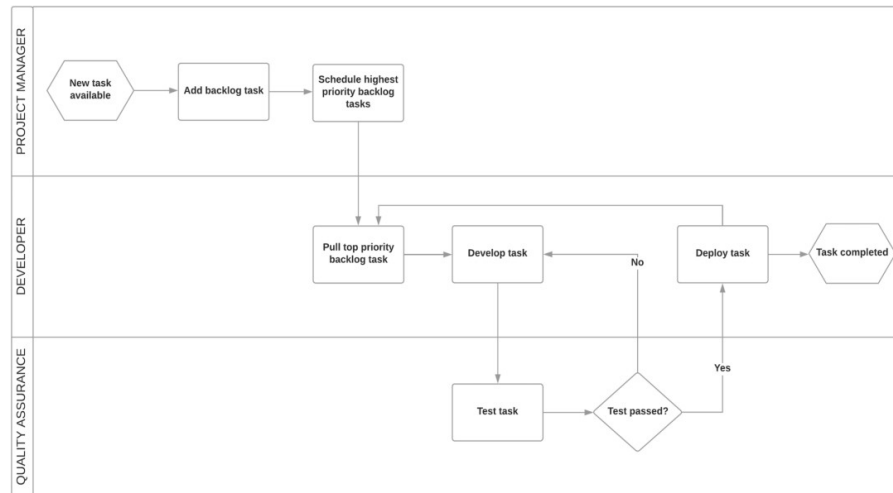

Fig. PROJECT FLOW

VI. FUTURE SCOPE

Cloud-based Solutions will feature more robust tools and higher computing power that will empower line managers to make faster decisions on the ground and take more responsibility to deliver results faster and with fewer chances of mistakes. Real-time data is shared, annotated, approved edited, read, translated, documented on the spot, etc. This tool will not only allow you to visualize your work but also store your work on secure cloud servers. As the development becomes more advanced day by day new technologies like machine learning, and the cloud will help to create more advanced thinkable kanban tools in upcoming days. Nowadays, drag and drop functionalities are added to kanban boards in the same way the huge developers communities will work on open source kanban projects. Open-source boards like Trello becomes more and more advanced because of open source communities. So, Open source development will help a lot to advance the functionality of kanban tools.

VII. CONCLUSION

There are lots of benefits of using the kanban tool in development, making the kanban board a popular framework in agile teams. Using its software development becomes a smoother processof accomplishing the project no matter its size. The Kanban principles and practices offer an evolutionary path towards agility without disrupting the current processes. The kanban tools are easy to adopt and digital Kanban boards help you visualize your work, WIP(work in progress) limits empower you to become more efficient in work. The kanban's ability to define bottlenecks, improved concentration, panoramic project view, prioritization of tasks, the flexibility of work, and team cohesion make the production smoother and more efficient. So, it is a best practice to use kanban while developing the products.