Agile Methods

Bhumit Patel
Department Of Computer Science
Lamar University, Beaumont Texas USA – 77705
patelbhumitp124@gmail.com

***Abstract*— now a days, software development companies aim to produce most usable software in less time period with less cost product. Agile methodology were meet the requirement of these software companies. This paper is introduced the agile method overview, difference between alternative method of agile, extreme programming and SCRUM.**

Keywords*— *Agile method; Extreme Programming(XP); SCRUM

I. INTRODUCTION

Agile development methodology provides the opportunities to assess the direction of a project during the development lifecycle. The use of the word **Agile** in this context derives from the agile manifesto. The meaning of agile word is light and sufficient. In 2001, small group of people got together to discuss their feelings that the traditional approach to managing software development projects was failing far too often, and they came up with the agile manifesto, which describes 4 important values which are as relevant today as they were then. That four important values are following.

- Interactions and individuals over processes and tools.
- Working software over comprehensive documentation.
- Customer collaboration over contract negotiation
- Responding to change over subsequent a plan.

The agile method was principle based rather than rule based. The small group had predefine rules according to relationship, role and activities. All person in the team are guided by the principles.

General Principle of Agile methods.

1. Their main priority is to satisfy the customer through early and nonstop delivery of valuable software.
2. The customers can change the requirements even after in late development process. Agile processes bind change for the customer's competitive advantage.
3. They deliver working software regularly, from a couple of weeks to a couple of months, with a preference of customer to the shorter period.
4. The developers and business peoples must work together on a daily basis until the project finish.
5. They motivate developers to build project. Give them the perfect environment and support whatever they need, and trust them to get the job done.
6. The face-to-face conversation is the most effective and efficient method of conveying information to and within a development team.
7. The working software is the primary goal of progress.
8. Agile processes promote sustainable development. The sponsors, developers, and users should be able to maintain a constant pace indefinitely.
9. The constant attention to every technical excellence and good design improves agility.
10. The art of maximizing the amount of work not done — is essential that's the simplicity.
11. The best design, requirements and architectures emerge from self-organizing teams.
12. On a regular time intervals, the team reflects on how to become more effective, after then tunes and adjusts its behavior consequently.

II. WATERFALL METHOD VS. AGILE METHOD

In 1970, Winston Royce proposed the waterfall methodology which managing software projects through five different stages. When the industry learned more about developing software, certain techniques for managing and predicting the cost of software development projects came into use the waterfall method. It contains five different type of stages which are requirements, design, implementation verification and maintenance. These different stages of waterfall model are in following figure.

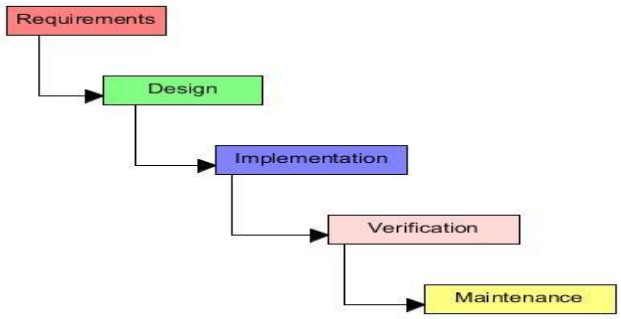

Figure 1: Waterfall Model.

Each phase consists on a definite set of activities and deliverables that must be accomplished before the following phase can begin. The requirement phase and design phase contain 15% of work each. The most important part which is implementation is contain 35% portion. The Verification process stage will contain 30%. And the last phase of waterfall

model which is maintenance, is covered 5%. The 70 percent of software projects using older methodology fail to meet their objectives.

The Waterfall method is incredibly rigid and inflexible than the agile method. One of the most important differences between the agile and waterfall approaches is that waterfall features distinct phases with checkpoints and deliverables at each phase, while agile methods have iterations rather than phases.

Agile method offers incredibility of flexibility design. Small teams work together with stakeholders to define quick prototypes, proof of concepts, or other visual means to describe the problem to be solved. In the agile method, after the project approval pre-iteration planning will occur. The team defines the requirements for the iteration, develops the code, and defines and runs integrated test scripts. After the iteration process, project will release to user and the users verify the results. Verification occurs much earlier in the development process than it would with waterfall, allowing stakeholders to fine-tune requirements while they're still relatively easy to change. The figure of agile process step-by-step shown in following.

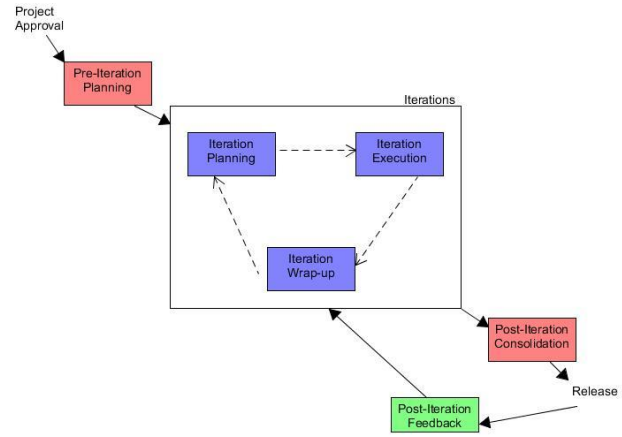

Figure 2: Agile method process.

Benefits of using Agile Method.

The Agile method allows for changes to be made in the project after the initial planning. Also, it can be re-writes to the program, as the client decides to make changes.

Because of agile method allow to changes in project during in-between of process that will makes the process very easy. The Agile Method grew out of experience with the real-life projects of leading software professionals from the past.

At the end of each phase, project priorities are evaluated. This will allow user to give their feedback to the developers for any kind of changes. The measuring and evaluating allows accurate and early visibility into the progress of each project.

Successively, the agile method has been accepted by the industry as a better solution to project development. However, now a days every software developer has used the agile method for better success. The agile method is really winning solution for everyone involved in software development industry.

Criticism of Agile Method.

- It is not user-centric but developer-centric
- Agile method does not focus in product design. But it does focus processes for getting requirements and developing code.
- Agile method can be efficient only in small type of organizations and some type of projects.

III. DESIGN

Agile Methodology

In a past few years, software development companies, most of the users' requirements were fairly stable, and development followed the plans without major changes. However some new difficulties emerged according to the growth of companies. These difficulties shown in following.

- Deadlines and budgets
- Miscommunications
- Evolving requirements
- Customer involvement

With these types of existence problems, the object oriented software development methodologies cannot satisfy the objectives of software development companies. So, new development methodology agile have to be applied in order to overcome these problems.

Agile methodologies prefer software development over documentation. Their view of idea is to deliver many working versions of the software in short repetitions, then update the existing software according to customer feedback. By the applying this idea will help to overcome the problems mentioned in earlier, by openhearted changes, satisfying client requirements and faster development.

Agile methodology includes following methods.

- Extreme Programming (XP)
- Dynamic System Development Method (DSDM)
- Agile Modeling
- SCRUM
- Crystal methods
- Feature-Driven Development (FDD)
- Adaptive Software Development (ASD)

However, from above methodology, Extreme Programming (XP) and SCRUM are most popular methods use in now a days.

1. Extreme Programming (XP):

In 2000, Kent Beck was presented the Extreme Programming. Extreme programming is also known as XP in a short form. Extreme programming (XP) has evolved from the problems caused by the long development cycles of traditional (like waterfall) development models. XP is a developing methodology which is suitable for object-oriented projects using teams of more or fewer programmers in one location. In XP, the team members spend few minutes on programming, few minutes on project management, few minutes on design, few minutes on feedback and few minutes on team building many times on each day. So, the extreme word comes from these common principles and practices to extreme level. In XP, there are main four stages of software development which are shown in following figure.

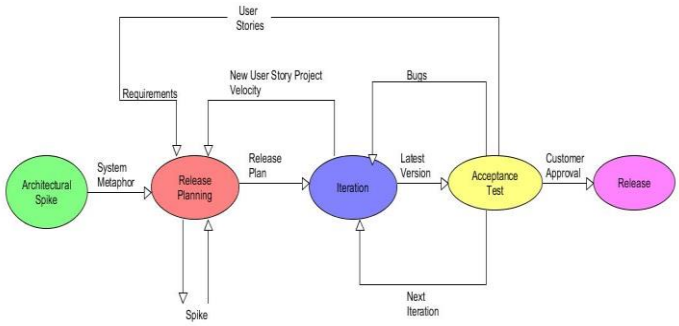

Figure 3: Extreme Programming (XP) Model

The XP methodology is based upon five important values which are: Communication, Simplicity, Feedback, Courage and Respect.

- **Communication:** XP has a society of oral correspondence and its practices are intended to encourage communication. The correspondence worth depends on the perception that most venture challenges happen on the grounds that somebody ought to have talked with another person to clear up an inquiry, work together, or get help. Issues with tasks can constantly be followed back to someone not conversing with another person about something vital.

- **Simplicity:** Outline the easiest item that addresses the client's issues. An essential part of the quality is to just outline and the code what is in the present necessities as opposed to envision and plan for implicit requirement.

- **Feedback:** The developers group gets criticism from the clients toward the end of every emphasis and outside release. This feedback drives the following iteration. Furthermore, there are short outline and usage input circles incorporated with the approach through pair programming and test-driven improvement.

- **Courage:** The other three qualities permit the group to have mettle in its activities and choice making. For instance, the advancement group may have the courage to oppose weight to make impossible duties.

- **Respect:** In XP, team members need to take care about each other and also tale care about the project.

The main objective of the XP methodology is that if the customer representative is on hand to review and approve user story implementations. However it is one of the greatest strength of XP.

2. SCRUM:

In 1995, Ken Swaber was invented SCRUM methodology. Before then, it was practiced for agile manifesto. But the agile methodology has the same underlying rules and concepts of agile software development like the scrum. Scrum is a developing process for managing any type of work and any product by an iterative and incremental ways. Scrum focuses on how the colleagues ought to work to deliver the framework adaptability in an always showing signs of change environment. At the end of each cycle it delivers a potential arrangement of usefulness. The expression "scrum" started from a procedure in the sport of rugby where it means making history an out-of-play a move once more into the game with collaboration.

In the scrum procedure puts project manager “wrapper” around a product development methodology. The strategy is adaptable on how much/how little service however the Scrum logic would manage a group towards as small function as could be expected under the circumstances. Typically a Scrum groups works co-found. Be that as it may, there have been Scrum groups that work topographically appropriated whereby developers partake in day by day meeting by means of speakerphone or any kind of communication. Scrum groups are self-coordinated and self-arranging groups. The group focuses on a characterized objective for an emphasis and is given the power, self-governance and obligation to choose how best to meet it.

Scrum for programming improvement left the quick prototyping group on the grounds that prototypers needed a procedure that would support a situation in which the necessities were fragmented toward the begin, as well as could change quickly possible in development. Unfortunately, scrum method includes development process as well as managerial process. Scrum software development method is depends and understood by following five key values.

- **Product Backlog:** This is the organized rundown of all elements and changes that have yet to be made to the framework wanted by numerous performing artists, for example, clients, marketing and deals and venture group.

The Product Owner is in charge of keeping up the Product Backlog.

- **Sprints:** Sprints are 30-days long, it is the methodology of adjusting to the changing natural variables like resources, knowledge, technology, requirements and time must result in a possibly shippable addition of programming. The working tool of the group are Sprint Planning Meetings, Sprint Backlog and Daily Scrum gatherings.

- **Sprint Planning Meeting:** Sprint arranging meeting is initially gone to by the clients, users, administration, Product owner and Scrum Team where an arrangement of objectives and usefulness are chosen. After that the Scrum Master and the Scrum Team concentrate on how the item is actualized during the Sprint.

- **Sprint Backlog:** It is the list of elements that is right now relegated to a specific Sprint. At the point when every one of the elements are finished another cycle of the framework is delivered.

- **Daily Scrum:** It is a day by day meeting for around 15 minutes, which are sorted out to monitor the advancement of the Scrum Team and address any obstruct problem confronted by the group.

Temporarily, SCRUM is measured an incremental method and iterative method of software development. It was suggested for software development projects and in the meantime, it can be used as a program management approach.

The greatest limitation of coordinated procedures is the way they handle larger groups. The Cockburn and Highsmith both presume that agile methodology is more troublesome for bigger groups as size develops organizing interfaces turn into a dominant issue. The Larry Constantine and Martin Fowler likewise trust that agile with face-to-face correspondence separates and turns out to be more troublesome and complex with designers more than 20. Conversely, heavyweight and plan-driven methods scale better to huge project.

IMPLEMENTATION OF AGILE METHODOLOGY

The Barry Boehm said that, "As we progress from examination, through to outline, coding, testing and creation, the expense of fixing an issue increments exponentially". But the Alistair Cockburn can't help contradicting with Boehm's announcement and reports, "As time passes by and the project gets greater, it costs less to execute a change with XP than with your traditional technique". Moreover, Kent Beck argue that the "expense of progress" curve graph is said to be straight in agile methodology. Additionally to support this conviction they demonstrate a few XP practices which are shown in following to guarantee that the expense connected with this curve graph is kept to minimum.

- Unit testing and test-driven development guarantees that bugs and mistakes are discovered rapidly and after that it would be fixed in cheaper cost.
- On location client and functional testing guarantee the examination and particular of the framework is up-to-date and exact with business requirement what they ask for.
- Pair programming permits two software developer cooperating on one PC, which increase the possibilities of discovering bugs and leads a more straightforward configuration.
- Refactoring and "once and just once" expands outline consistency and adding more effortlessness and flexibility to the structure. This will guarantee the framework is very well design and simple to changeable.
- Normal releases gives the user criticism and powers the group to make the "release to creation" and support stages as cheaper cost as possible.

The above agile method principles attack the bases of the high cost of solving the errors with great details, great plans, great implementation and quick feedback from client.

CONCLUSION

In this survey paper, I described the general view of software development methods through waterfall method and agile method. Additionally, I also discuss about the comparisons with waterfall method against agile method. I provided some overview of agile method design and describe two of them methodology of agile like Extreme Programming (XP) and SCRUM. I described the procedure of two of them methods that how they work in software development process. If there is big chance of misinterpretation of client's requirements or if the budget and deadline are limited, then agile method is the best solution for software development which apply in there. Finally, the main aim of the agile method is to deliver the customers' requirements whenever they needed.

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