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Review Paper

A Survey of Agile Methodology over Cloud Computing

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Abstract

Cloud computing approach is an advanced process for enabling on-demand, well-situated network access to share virtual resources using various platforms and infrastructures for computational purposes. It emphasizes the involvement of virtual network, servers, applications, tools, storage, services etc based on the demand of users. The cloud process can be implemented in a better way by using agile model. It is a progressive and repetitive development process in accordance with customer association and it is bounded with the approach followed in the market with respect to time. The fundamentals of agile development are a practitioner-centred methodology, very close contact with customers, abundant small milestones and a welcoming attitude about change. The development process of agile provides more control in the management and handling customers while preserving the inventiveness and production of technical job. Implementing agile methodologies over cloud computing behaves as a bridge between them for a better software development platform. This connection provides the benefits, improvements, increased quality in the software development process.

Keywords: Cloud Computing, Agile Methodology, SCRUM, Product Backlog, Test-Driven Development.

Introduction

Agile is a substitute to traditional project management, typically used in software development. It helps teams respond to unpredictability through incremental, iterative work cadences, known as sprints. Agile methodologies are an alternative to waterfall, or traditional sequential development. As the time demands for the faster communication of the business process with the software development, agile process provides an answer for all the short coming faced inside the marketing strategies. Software developers can configure, design, code, implements and deliver their project to the customers based on the user requirements. And the end-users can review deployed functionalities of coded project and give their remarks, suggestions and ask for the changes.

The working environment between developer, tester and user becomes highly interactive and useful. As knowing the facts of agile process which leads to a successful business perspectives, but on configuring it with cloud based environment which provides a higher level of flexibility to the user and it gives satisfactory level of service which eliminates the loss and lowers the expenses. Now the most important facts is that how to utilize the cloud computing environment and how to deploy it with the running business in order to maintain the security policies during identification of cloud model that best fits. The goal of this paper is to improvise the advantageous effect of merging agile methodologies in cloud computing paradigm. Agile methodology encompasses the complete of the project all over the complete growth life cycle. Agile software development methods are attempting to offer an answer to the eager business community asking for less extensive software development methodologies with faster software development processes[1].

Defining Agile

A repetitive and progressive approach in developing the software product which can be performed in a highly resolute manner. The efforts required to strengthen the team effort by rigorously involve all the team members with their roles and responsibility that produce the high-quality products in a cost precious and well-timed style which meets the changing needs of its stakeholders.

Agile Scrum Testing

Scrum is a subset of Agile. It is a lightweight process framework for agile development. The Agile Scrum process framework requires the use of development cycles called Sprints. An Agile Scrum process is distinguished from other agile processes by specific concepts and practices, divided into the three categories of Roles, Artefacts, and Time Boxes. The Agile scrum testing as shown in Figure-1 – Improvised Agile SCRUM process Over Cloud[2].

Agile Methodology and Cloud Computing

An agile methodology is a theoretical structure that promotes unremitting connections through the development cycle. The

software developed through agile process is the output of continuous development and enhancement of software product and cloud computing is used to fulfil the on-demand delivery to buyers. Cloud computing provides environments for test and development teams for doing agile projects. To reduce software development cost, time to market and to improve the productivity, we can connect agile methods with cloud computing. There is much SaaS, PaaS and IaaS solutions to help alliance between people when exchanging and sharing resources.

As agile process is the combinations of number of iterations which is performed in every sprints, so cloud computing enabling technology helps in lowering the gaps between different iterations and helps in fulfilling the demands of users. It involves infrastructure, platform, web and desktop applications, business approaches to individual association can be delivered to end user as a service. This service is indefinite as clients can access the application from any remote location by online connection. The only thing that user need to look-over is the URL with its login credentials, rest can be easily accessible which thereby increases the user's satisfaction. By adopting, the agile development methodology and cloud solutions for development and test, the organization can reduce its cost of production, deployment and iteration cost, also the operation and maintenance cost can be lowered. Several task can be performed in parallel combining with development, implementation and testing by adopting agile method and cloud computing environment. It helps the tester to create test scripts, execute it and identification of bugs and its fixing time can be done simultaneously. In addition, it covers software testing issues and challenges for clouds and cloud-based applications in different perspectives from end-users, vendors, and application providers[3].

Advantages of using agile methods with Cloud Computing: The gains that can be seen when agile process is adopted along with cloud computing environment are: i. Reduction in Man Power, ii. Efficient use of resources, iii. Parallel task performance, iv. Reduction in cost, v. Time savings, vi. Increased in on-demand service.

Agile Delivery Lifecycle

Agile scrum testing must be fit with the quality strategies into the overall agile system development lifecycle (SDLC). There are several phases to the delivery lifecycle as shown in Figure-2 – Agile Delivery Lifecycle.

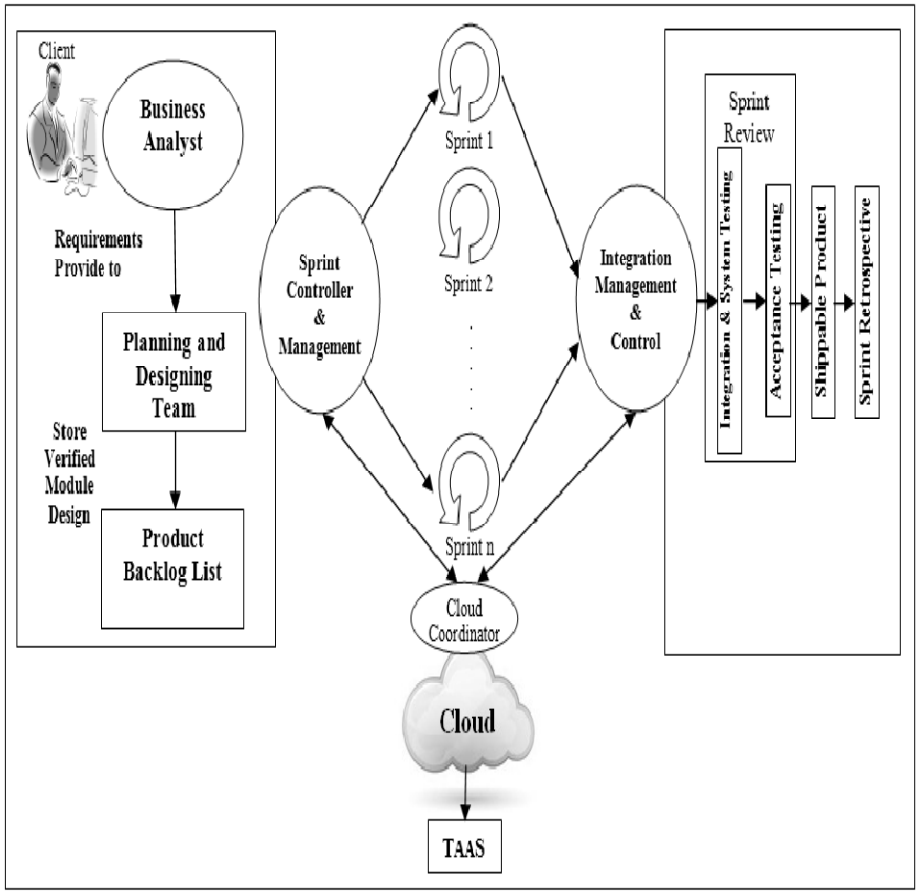

Figure-1
Improvised Agile SCRUM process Over Cloud[2]

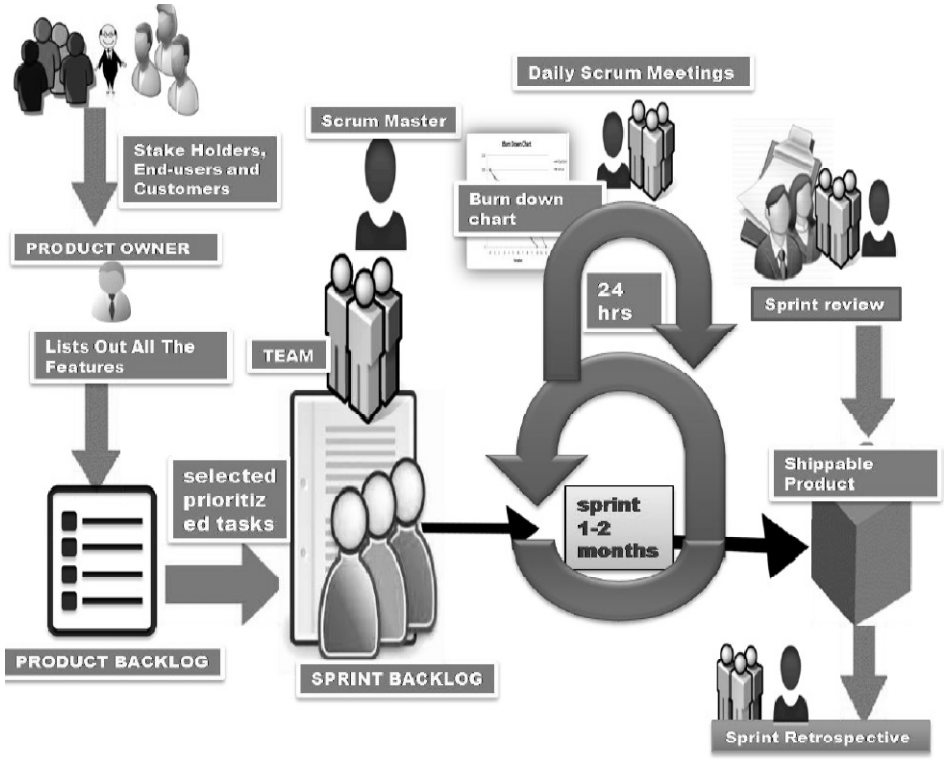

Figure-2
Agile Delivery Lifecycle[2]

Initiation: This phase initiates the strategies of the agile team. Firstly the initial requirements, initial architecture envisioning has been identified and delivered to the team who organize and manage the development team. Then Testing environment has been built for reviewing the initial models, executable plans and vision and goal related documents.

Building iterations: During building each iteration it fulfils the requirements given by the clients to produce shippable software. Every product backlog consists of various features of the product which need to prioritize them in various sprints which further get categorized into different iterations. Each iteration contains the most important requirements remaining from the work item stack and implements them. The agile team consists of testers who are deep-rooted with the developers, who work in parallel with the developers.

Evolution: The goal of the Evolution phase is to productively deploy the tested iterations in the system into production phase. This deployment task is relatively complex practice which requires end user training, help from support and operation team, proper communication and involvement of every individual who involves for the product release; backup storage space; final renovation of the user interface and its documentation and so on.

Now it's time to release the project, when doing so one round of testing is done in order to ensure that whether the system is ready or not.

How Agile is Different

Traditionally, the testing approach was very time consuming and it has limitations, by moving to the agile development may find the following aspects to be very effective than what they are used to:

Greater Teamwork: The environment in agile scrum process supports direct communication over passing documentations back and forth to each other. Agile development and testing team work closely together. They identify that documentation is the least effectual manner of communication between people.

Reduced work cycle: To specify and fulfils the requirement and validating it is now on the order of minutes, not months or years, due to the implementation of test-driven development (TDD) approaches, greater teamwork, and less of a dependence on brief documentation.

Agilists hold change: Whenever there is a change in the requirements, the agile developers and testers select the prioritized task which will be adopted throughout the lifecycle and will be further implemented in the production release.

Flexibility to Testing Team: In traditional model, the development team handles the complete development cycle then it comes to the testers for testing purpose. But the agile model gives the flexibility to evolve the developers and testers requirements throughout the project.

Disciplined IT culture: Agile development model provides a far greater disciplined environment than does traditional development. It gives an opportunity to closely work with your stakeholders, respect their decisions.

Comparing Agile and Traditional Approaches

On comparing traditional approach of software development and agile methodologies, following are the benefits offered in the agile mode:

Infrastructure: On combining cloud and agile model it reduces the infrastructure cost like software license cost, cost for monitoring the tools and hardware cost is also reduces. Allocations of resources are done based on the demand and need of the application and its users.

Communication: It provides a frequent communication between the developers, testing team and other team members.

Prioritizing the task: Every sprint gives the opportunity to prioritize the task from all the available features of the product backlog and the team is distributed for proper controlling and monitoring.

Functionality: In terms of functionality, the agile teams manages its utility in improvising the success of project and implements the actual needs of their stakeholders. The agile method overcomes the functionality of traditional model which were followed earlier and it proves more effective.

Excellence: Regular communication enhances the quality of the developed product. Even though the study of the researchers found that agile approaches are perceptible in order to provide the result in a greater quality than traditional approaches. The excellence is achieved during refining the project going through every iterations and the final outcome is a quality product.

Design: Architectural design is very important to agile teams that they do throughout the lifecycle which is achieved by greater levels of collaboration exhibited by agile teams.

Challenges in Agile Testing

While every user wants to get better business processes from software providers in order to augment customer satisfaction and save more money. The Agile tester plays a vital role in the completion of agile projects. But to adapt the change related to the implementation of the project is a difficult task. The tester faced various types of challenges during the complete agile development process: i. Time boundation in every sprint cycle. ii. Redistribution and estimates of resource requirements, iii. Difference between actual hours and estimated hours daily. iv. Keep the Daily Scrum meetings short, v. Code Inspections are Paramount, vi. Daily scrum meetings became difficult many times as the team members were working from home or travelling. vii. To share the build's release documents and other related documentation at run time with the offshore team members[4]. viii. The requirement coming from offshore clients in a random manner becomes difficult.

Conclusion

It is now believed that the future of business process in the IT industries will be cloud computing. Various software applications are delivered through cloud based environment which will only be implemented and tested using cloud computing techniques. Every research focuses on three important factors – Cost, Time and Quality. Implementation of agile scrum over cloud gives a newer development towards the upliftment of on-demand software development process. In the coming future, more architectural design can be implemented in the application using agile methodologies. A more rigorous testing can be achieved with agile lifecycle which influence the communications between on-shore and off-shore team to overcome the difficulties coming during throughout the lifecycle.

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