Analysis of Agile Software Development Utilising Cloud Computing Capabilities

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Abstract - The evolution of agile development has changed the method of software development. The agile development strategy was at large missing a development platform for supporting rapid development. Cloud computing provides this necessary acceleration needed to enhance the agile development. This paper describes the link between the agile methods and how cloud computing can aggravate the development phases.

Key words - Cloud computing, Agile software development

I. INTRODUCTION

Industries are now using agile software development teams and cloud computing to accelerate development operations . Cloud computing and virtualization make agile development teams to combine multiple phases of development with other cloud services[1]. This paper provides an insight into how agile development methodology can extort Cloud computing features and enhance software development. Further it goes on to the cloud computing functionalities that provides the apparent framework for agile software development.

II. CLOUD COMPUTING

Cloud Computing is a model that enables convenient, on-demand network access to a pool of shared and configurable computing resources that are rapidly provisioned with minimal management effort or service provider interaction[6]. Cloud computing is purely based on internet. A cloud actually is a grid of computers serving as a "service-oriented" architecture to deliver software and data. Some advantages of Cloud Computing are:

- Maximises the affect of sharing resources
- Avoids upfront infrastructure cost
- Cloud Computing allows enterprises to run applications faster
- Helps achieve higher economies of scale
- Provides a centralised storage mechanism

III. CLOUD ENVIRONMENT

A typical cloud environment consists of the following services and models [2]:

A. Categories of Service:

- Infrastructure as a Service(IaaS): provides virtual machines and other abstracted hardware and operating systems

- Platform as a Service(PaaS): allows customers to develop new applications using APIs, implemented and operated remotely.

The platforms offered include development tools, configuration management and deployment platforms.

- *Software as a Service(SaaS):* is software offered by a third party provider, available on demand, usually through a Web browser, operating in a remote manner.

B. Cloud Deployment Models:

- Public cloud: Infrastructure is available to the general public or large industry group and is owned by an organization selling cloud services.
- Private cloud: Infrastructure is operated entirely for a single organization. It may be managed by organization or a third party, and may exist in-premises or off-premises.
- Community cloud: Infrastructure is shared by several organizations and supports a specific community.
- Hybrid cloud: Infrastructure is composed of two or more clouds (private, community or public) that are bound together by standardized or proprietary technology that enables portability of data and application.

III. AGILE METHODOLOGY

Agile software development methodology permits incremental change over time through collaboration. Agile development was invented in the nineties and has revolutionized how software is developed by emphasizing short development cycles based on timely customer feedback .Agile software development is a method based on iterative and incremental development. With Agile framework, the development phases are constantly subjected to the reality check of actual users. This methodology involves interaction between self-organizing and cross –functional teams. Industries are now using agile software development teams and cloud computing to accelerate development operations. Cloud computing and virtualization make agile development teams to combine multiple phases of development with other cloud services.

IV. WHEN AGILE METHODOLOGY SHOULD BE USED?

- When there is no clear cut idea about how the end product should look like.
- When there are adaptable and skilled developers capable of thinking independently.
- When quick production is required compromising on the quality of the product does not matter

V. IDEOLOGY BEHIND CHOOSING AGILE METHODOLOGY

- It provides the framework to build the best possible software solutions for clients to meet every expectation, even the ones that are not clear at the beginning of the project[11].
- Agile methodology's rapid results and frequent releases of work-in-progress ensure that the project's real needs are tracked timely.
- The methodology makes the clients part of the project's team, so by working together it is easy to identify the best and most cost effective ways to accommodate the client's needs.

VI. AGILE+CLOUD

Agile development was lacking a development platform that supports the rapid development cycles that make the methodology work. Cloud computing makes a substantial difference here by eliminating the cumbersome distribution requirements that can bring agile development to a crawl. With no patches to distribute, and no reinstallations needed Cloud computing, makes it available to users immediately by installing the new distributions on hosted servers. This provides a possibility that the application you run today was modified just the night before[8]. It's now evident that cloud computing is what agile development has been waiting for. When it comes to traditional software environments, new software distribution is a tedious task that needs reinstallation, and help from the support team. Under such circumstances, months or even years are needed to get a new distribution to the users. Incorporating their feedback for the next release then requires comparable time.
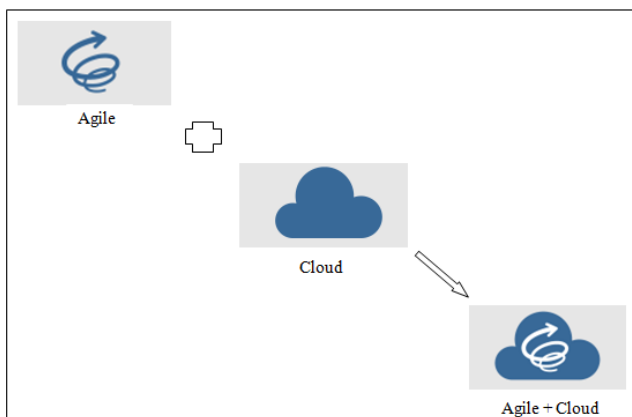

Fig.Agile+Cloud Combination

Agile cloud is an information base that creates information system requirements and maintains the information model. It is the business application need of the hour. Some different ways cloud computing enhances agile software development[7]:

- *Cloud + Agile a parallel activity:* With agile methodology although its aim is to eliminate the delays from the software development phases it actually compromises certain facts. But with cloud computing it becomes a parallel activity by leading it to a more effective utilization for the software development teams.
- *Cloud encourages innovation and experimentation:* By combining agile software development with cloud computing the team can build faster products with handy experimentation and generates instances to innovate. The development teams can develop, quickly code and also test. There is absolutely no need to wait for the next release as in the case when only limited servers are available.
- *Cloud enhances iterative development through continuous integration:* The testing phase of the software development cycle is an iterative process that the team needs to subsequently fix the errors that occur on testing. As there are a large number of virtual machines to the agile team within the cloud it accelerates the speed on delivery. Thus he cloud's virtualisation enhances integration in time.
- *Cloud provides servers for the development:* By making use of the Cloud computing virtualization the software development teams in an agile environment have unlimited number of servers available. Without the cloud's facilities the teams will be limited to just one server per development. Cloud computing reduces the dependency for physical servers and hence proceed to the development.
- *Cloud computing facilitates code branching:* In agile practices development efforts last longer than a release. Code refactoring is to be enhanced and used in production. In some cases even code branching is necessary where a lot of puzzling is necessary. With Cloud computing the upfront cost of renting servers for these sort of purposes can be avoided.
- *Cloud Computing provides Delivery platforms for agile* development: Cloud offers many development services as Software as a Service (SaaS) and the Agile development can make use of these services in combination with virtualization. Offerings from Amazon Web Services, GoGrid, OpSource and RackSpace Cloud and others provide a range of project management tasks that enhance the Agile development.

VII. CONCLUSION: CLOUD COMPUTING AND AGILE DEVELOPMENT A GREAT COMBINATION

This paper is a study related to the cloud computing's indispensability when agile teams aim to produce standard products via continuous integration and delivery methods. Agile development points to a parallel activity with the cloud computing features than a serial one cutting out the delays in provisioning the components. Thus it is evident that the enterprises turn to this combination as it provides better chances for innovative development with standard business objectives.

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43