Enhancing Agile Software Development Using Cloud Computing: A Case Study

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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.

Keywords
Cloud computing, Agile software development, Agile manifesto

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. 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 virtualization 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. 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.

1. Advantages of Cloud Computing
• Maximises the affect of sharing resources
• Avoids upfront infrastructure cost
• Cloud Computing allows enterprises 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:

1. 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.

IV. Agile Methodology
Agile development was invented in the nineties and has revolutionized how software is developed by emphasizing short development cycles based on timely customer feedback [1]. Agile software development is a method based on iterative and incremental development. With Agile framework, the development phases is constantly subjected to the reality check of actual users. This methodology involves interaction between self-organizing and cross-functional teams.

1. Agile manifesto
The Agile Manifesto was introduced in 2001[10]. The aim of the Manifesto was to define the approach towards agile development. Ever since its introduction it has dramatically changed the elevation of modern software engineering.
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: the application you run today was modified just the night before. 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.

VI. The Different Ways Cloud Computing Enhances Agile Software Development

- Cloud computing provides the required 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 and Agile development parallel activity: With agile methodology, it has been proved that the delays from the software development phases 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 Computing encourages innovation through investigation: 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 Computing 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 Computing provides Delivery platforms that enhance 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 virtualisation. Offerings from Amazon Web Services, GoGrid, OpSource and RackSpace Cloud and others provide a range of project management tasks that enhance the Agile development.
- Cloud computing facilitates code branching: In agile practises 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.
Fig. 2: Stages of Cloud computing

**VII. Conclusion: Cloud Computing and Agile Development A Great Combination**

This paper is a study related to the cloud computing 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.

**References**


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