



Lean Agile Methodologies Accentuate Benefits of Cloud Computing

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Advances in technologies such as virtualization, storage and high-speed network access, as well as a growing comfort with Internet security and reliability, have led to increasing adoption of Cloud Computing. Cloud Computing is becoming the vehicle of choice for application delivery because it is convenient to both the producer and consumer of the software applications.

In this new world of application deployment/delivery, features are pushed to the end users within hours of being developed, rather than going through months of installation, deployment and/or customization. Antiquated software development processes like the waterfall process don't exactly fit into this brave new world and are increasingly being replaced by the Lean Agile software development processes. According to a Gartner report titled "Predicts 2010: Agile and Cloud Impact Application Development Directions," published in March 2010, 80% of software development projects will utilize Agile development methods. Lean Agile development methods – with their focus on frequent release and user feedback – align well with the Cloud Computing paradigm, combining faster application delivery with collaborative, iterative development.

How Cloud Computing Benefits a Company

Cloud computing is a new wave of IT infrastructure that allows businesses to run their applications on a shared data center space. Unlike traditional licensed software, cloud technology brings in efficiency by eliminating the cumbersome processes related to software development, testing, installation and failovers. The major advantages of cloud computing include:

- No hardware or software required for cloud services
- Easy integration with other enterprise solutions
- Fast deployment, coupled with less probability of failovers
- Highly customizable environment
- Optimum utilization of in-house IT resources

Capitalizing on these advantages, cloud computing has gradually become a rage among companies around the globe. According to Gartner, cloud computing will become the preferred vehicle for application delivery by 2015. Thus, the majority of CIOs are gearing up IT infrastructure to suit the cloud environment.



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What Is Lean Agile Software Development?

Conceptually, Lean and Agile are two different production methodologies that are used extensively in business. The Lean business approach is derived from the production processes adopted by Toyota after World War II. It focuses on a demand-driven approach with an emphasis on:

- Building only what is needed
- Eliminating anything that does not add value
- Stopping production if something goes wrong

The Agile approach is focused on the notion that software should be developed in small iterations with frequent releases, because neither the end user requirements nor the exact amount of effort can be accurately determined upfront. Even the end users themselves cannot fully articulate what they need, because more often than not, they do not know what can be done. Hence, the requirements must be collaboratively discovered. Agile processes involve building software in small segments, testing those segments and then getting end user feedback. They aim to create a rapid feedback loop between the developers and the actual users.

For the past few years, software development experts have been conversing more and more in a language that combines elements from both 'Lean' and 'Agile'. This trend has resulted in a new approach in the software industry that has constituents of both methodologies.

The Agile methods focus on engineering practices to increase the quality and stability of software. However, Agile methods do not define how to organize processes among different teams working on a project. This is where 'Lean' comes into play. The Lean manufacturing system calls for breaking the development task into several small streams. The output of one stream results in the next value stream. Thus, a combination of Lean and Agile methods offers a comprehensive and process-oriented approach towards software development.

Lean Agile Software Development Replaces Waterfall Methodology

Since its inception in 1970s, the waterfall approach has been successfully used by engineers to develop software. It involves a linear and sequential process to application development. The process is divided into multiple stages with distinct goals. Understanding customer requirements is the first stage; this means communicating with the clients to understand their business and application-specific needs. This is followed by the design, implementation and evaluation stages.

The waterfall method supposedly provides the following benefits:

- Defined stages and standards that help in analyzing the exact budget for any application development
- Saves time and effort through a linear approach



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With an arguably successful track record, the waterfall approach was able to dominate the software development landscape for a long time, even though there were pockets of innovators promoting incremental approaches such as “Spiral development.” However, the waterfall approach suffers from inherent drawbacks, which have a negative impact on the software industry overall in terms of inefficiencies and delivery of features that were never used.

The biggest disadvantage of the waterfall approach can be inferred from its name: When water has crossed the edge of a waterfall, it cannot retreat. Similarly, if a flaw has survived a stage, it is then very expensive to correct it in the subsequent stages of application development. This is painfully obvious for flaws in requirement gathering and design.

The waterfall method deploys an upfront requirement-gathering and design approach, which assumes that the end users know the requirements (i.e., how they want the software to behave) and leaves all the design work to the software development organization. This is a fallacy: End users do not know the “Requirements” because they don’t know what the system can really do. In reality, user requirements must be collaboratively discovered.

Specifically, the waterfall approach is a bit incongruent to the cloud computing model, which focuses on rapid deployment and delivery, providing an opportunity for developers to collaborate with the customers for requirement discovery by making it easy to do frequent software releases.

Lean Agile development processes, on the other hand, do not assume that all requirements are known upfront. They focus on “discovery” of requirements through a collaborative design process whereby software and features are released frequently, which allows both the users and the developers to experiment. This creates a highly interactive environment between the developers and the application’s users. Thus, using lean agile software methods in conjunction with cloud computing deployment lets software application delivery organizations eliminate waste, lower costs while providing a higher level of service, and increase response times for meeting customer needs.

Lean Agile and Cloud Computing Build upon Each Other’s Strengths

Lean Agile development methodologies and Cloud Computing complement each other very well. Cloud Services take pride in meeting user requirements rapidly; delivering applications whenever and to whatever extent they are needed. Agile methods give high credence to user collaboration in requirements discovery.

The lean agile system of software development aims to break down project requirements into small, achievable segments. This approach guarantees user feedback on every task of the project. Segments can be planned, developed and tested individually to maintain high quality



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standards and almost no bottlenecks. The development stage of every component thus becomes a single “iteration” process. Moreover, lean agile software methods place huge emphasis on developing a collaborative relationship between application developers and end users. The entire development process is transparent to the end user. Feedback is sought at all stages of development, and changes are made accordingly.

Using lean agile development in conjunction with cloud computing provides a highly interactive and collaborative environment. The moment developers finalize a feature, they can push it as a cloud service; users can review it instantly and provide valuable feedback. Thus, a lengthy feedback cycle can be eliminated, reducing the probability of misstated or misunderstood requirements. This considerably curtails the time and efforts for the software development organization while increasing end user satisfaction.

Following the lean agile approach of demand-driven production, end user needs are integrated in a more cohesive and efficient manner with software delivery (as cloud services). This approach stimulates a greater degree of innovation and requirement discovery and validation in cloud computing.

To gauge industry trends related to the adoption of agile methods with cloud computing deployment model technology, CapGemini, in association with HP, conducted a survey in 2010. The study surveyed approximately 30,000 cloud experts, IT managers, engineers and quality assurance managers working in leading firms across Asia, Europe and North America. The study concluded that with an increase in cloud services, organizations are focusing on deploying lean agile methods to streamline operations. About 60% of the organizations that took part in the survey are expected to integrate lean agile methods as part of their operations for forthcoming cloud projects and services. This approach will also help generate quick user feedback and enable the organizations to monitor quality standards at every segment of the development.

The major benefits, therefore, of using lean agile software development in conjunction with the cloud computing paradigm include:

- Increased quality of application
- Effective resource utilization
- Reduced time to market
- Cost savings

In the words of Jonathan Rende, vice president and general manager of Business Technology Optimization Applications for the Software and Solutions unit at HP, “IT providers are facing intense pressure to develop new applications that provide competitive edge, bring greater efficiency and generate measurable results.” Integrating agile methods with cloud computing will



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enable organizations to strengthen their IT portfolio for better service delivery while lowering costs.

Summary

Combining lean agile development methodologies with cloud computing brings the best of both worlds. Cloud computing is how software applications are delivered today. It is the result of advances in technology, ranging from increased processing power (which made virtualization a reality), increased sophistication of storage area networks (which made storage seamlessly scalable), ubiquitous high-bandwidth network access, and the increased security and reliability of the Internet. Lean agile development processes optimize the opportunity provided by cloud computing by doing software releases iteratively and getting user feedback more frequently. It is essential for software development organizations to consider lean agile development methodologies while coming up with their cloud computing strategy.

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