Analytical Study of Agile Methodology with Cloud Computing

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ABSTRACT
Agile development methodologies are very promising in the software industry. Agile development techniques are very realistic in understanding the fact that requirement in a business environment changes constantly. Agile development processes optimize the opportunity provided by cloud computing by doing software releases iteratively and getting user feedback more frequently.

This research work, a study on Agile Methods and cloud computing. This paper analyzes the Agile Management & development methods and its benefits with cloud computing. Combining agile development methodologies with cloud computing brings the best of both worlds.

Keywords
Agile Methodologies, Cloud Computing, Software Development.

1. INTRODUCTION
Agile methodology is an approach to project management, generally used in software development. It helps teams respond to the unpredictability of building software through incremental, iterative work cadences, known as sprints. Agile methods are a response to the inability of traditional methods to embrace change in a turbulent business environment that demands software to meet its needs quickly [2]. Agile methods are light weight software schemes. Agile development methodology attempts to provide a lot of opportunities to assess the direction of a project throughout the development lifecycle. Highly artistic people who have understood the faults of regular software management processes are using agile development methods in organizations [1]. Many organizations all around the world are trying out the various available agile development methods.

Agile Development with Cloud Computing:

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 offer tall credence to user collaboration in requirements discovery. The agile system of software development aims to break down project requirements into little, achievable segments. This approach guarantees user feedback on all task of the project. Segments can be planned, developed and tested individually to maintain high quality standards and approximately 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 with end users [2, 4]. The whole development process is transparent to the end user. Feedback is sought at the entire stages of development, and changes are made accordingly.

Using lean agile development in conjunction with cloud computing provides a highly interactive as well as collaborative environment. The moment developers finalize a feature, they can push it as a cloud service; users can analysis it instantly and offer valuable feedback. Thus, a lengthy feedback cycle can be eliminated, reducing the probability of misstated or misunderstood requirements [4]. This considerably curtails the time and efforts for the software development organization while increasing end user satisfaction.

Following the agile approach of demand-driven production, end user needs are integrated in a extra 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 study in 2010.

The study surveyed around 30,000 cloud experts, IT managers, and engineers along with quality assurance managers working in leading firms across Asia, Europe and North America [4]. 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 [4]. This approach will also help generate quick user feedback and enable the organizations to monitor quality standards at each segment of the development.

The key benefits, therefore, of using lean agile software development in conjunction with the cloud computing paradigm include: enable organizations to strengthen their IT portfolio for better service delivery while lowering costs.

2. TECHNICAL OVERVIEW
The development methodology chosen is based upon the correctness to the project and the client. This can differ from traditional 'waterfall' approaches (detailed definition phase, build phase, testing-phase, and then deliver), to more agile strategies involving frequent releases, continual integration,

continuing client involvement, iterative functional deliveries, and usual necessities reviews.

Why Agile?

Agile development methodology attempts to provide a lot of opportunities to assess the direction of a project during the development lifecycle. This is achieved through regular cadences of work, well-known as sprints or iterations, at the end of which teams must present a shippable increment of work. Thus by focusing on the repetition of shortened work cycles as well as the functional product they yield, agile methodology could be explained as "iterative" and "incremental." In waterfall, development teams just have one chance to get each aspect of a project right. In an agile paradigm, every aspect of requirements, development, design, etc. is continually revisited during the lifecycle [5].
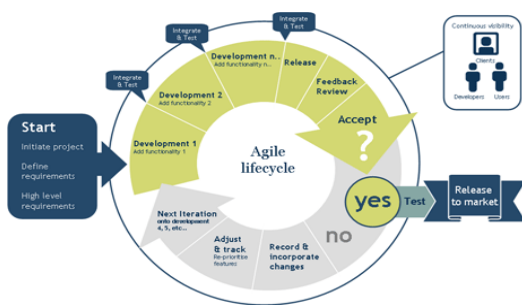

Figure 1 Agile Lifecycle

Fundamental underlying principles of agile methodologies:

[1]Individuals are more important than processes and tools.

[2]Working software is more important than comprehensive documentation.

[3]Customer collaboration is more important than contract negotiation [4].

[4]Responding to change is more important than following a plan.

These principles are referred to as the 'Agile Manifesto' [6].There is no single agile development Methodology. Some examples of agile approaches and methodologies that share a lot of of these core values include: Extreme Programming (XP); Feature Driven Development (FDD Crystal Methods; SCRUM; Dynamic Systems Development Method (DSDM); and Adaptive Software Development (ASD) (Highsmith 2001, Sutherland 2001) [6].

How Cloud Computing Benefits a Company:

Cloud computing refers to the provision of computational resources on demand via a computer network. It enables tasks to be assigned to arrangement of software and services over a network. This network of servers is the cloud.
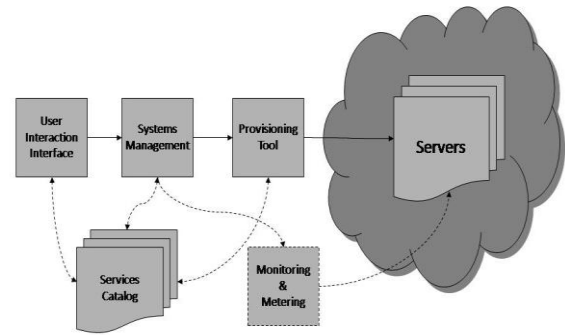

Figure 2: Architecture of Cloud Computing

Cloud computing is a fresh wave of IT infrastructure that permits businesses to run their applications on a shared data center space. Unlike traditional licensed software, cloud technology brings in efficiency by removing the cumbersome processes related to software development, testing, installation and failovers [7].

The key advantages of cloud computing includes:

• No hardware or software required for cloud computing services.

• Easy combination with other enterprise solutions.

• Highly customizable environment.

•Quick deployment, coupled with less probability of failovers.

• Optimum utilization of in-house IT resources [6].

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.

3.   COMPUTING   AND   AGILE DEVELOPMENT:
A GREAT COMBINATION

Cloud computing is the perfect environment for agile development. It lets you get valuable functionality to your customers quickly, collect instantaneous feedback, and make quick changes based on that feedback. This rapid development cycle, an inherent benefit of cloud computing, are impossible to implement in the conventional development model because of the huge cost of distribution.
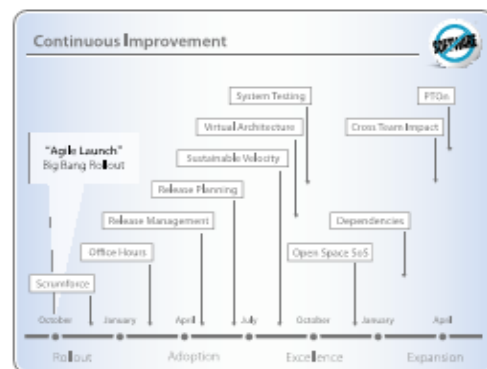

Figure 3: Cloud computing with agile at salesforce.com

Customer feedback is now wicker into the process at each stage—an email sent or idea posted on the idea Exchange today may drive tomorrow's functionality. As a result, the team supports only the present production release and next release—not years of legacy releases. That means that each day, hundreds of people check into the same code base. When someone makes a change that may break existing code, everyone immediately knows about it, so there's no time wasted in the merge and integration processes later in the cycle.

Advantages of Cloud Computing with Agile Development:

• Shortened development cycle-time of 75%.

• Higher stability of work-loads.

• Higher utilization of work-load, that is,

Developing large-scale, software systems with a fixed number of developers.

• Higher quality by earlier feedback from the customers.

• Higher flexibility to change of   Management and development plans.

• Reduce the cost of moving information between people.

• Place people physically closer.

• Reduce the elapsed time between making a decision to seeing the consequence of that decision.

• Replace documents with talking in person and at whiteboards, and

• Improver the team's amicability-its sense of community and morale- so that people are more inclined to relay valuable information quickly.

4. RECOMMENDATIONS FOR FUTURE RESEARCH

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, increased sophistication of storage region networks (which made storage seamlessly scalable), ubiquitous high-bandwidth network access, and the increased security and reliability of the internet. 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.

5. CONCLUSION

Agile methods are light weight software methods. Agile development methods are very pragmatic in understanding the fact that requirement in a business environment changes constantly. Highly creative people who have understood the shortcomings of normal software management processes are using agile development methods in organizations. Many organizations all around the world are trying out the various available agile development methods. Agile development processes optimize the opportunity provided by cloud computing by doing software releases iteratively and getting user feedback more frequently

6. REFERENCES

[1].AgileAlliance. (2001, February). History: The Agile Manifesto. Retrieved Sept 22 2004, from the World Wide Web: http://agilemanifesto.org/history.html

[2]. Amber, Scott. (2002). When and when aren't you Agile Modeling? Retrieved Sept 22 2004, from the World Wide Web:
http://www.agilemodeling.com/essays/whenAreYouAgileModeling.html

[3].Aoyama, Mikio. (1998, November). IEEE Software: Web-based Agile Software Development. Retrieved Sept 22 2004, from the World Wide Web: http://rockfishcs. cs.unc.edu/COMP290-S02/Aoyama-98.pdf

[4]. Lean Agile Methodologies Accentuate Benefits of Cloud Computing.   Web: www.thetechnologygurus.com/.../LACC_white_paper_ed_v5. 320180428.

[5]. Chromatic. (2001, May). O'Reilly Open Source Convention: An Introduction to Extreme Programming. Retrieved Sept 22 2004, from the World Wide Web:

http://linux.oreilly.net.com/pub/a/linux/2001/05/04/xp_intro.html

[6]. Cockburn, Alisair., Highsmith, Jim . (2001, September). Agile Software Development: The people Factor. Retrieved Sept 22 2004, from the WorldWideWeb: http://www.adaptivesd.com/Articles/IEEEArticle2Final.pdf

[7].Cockburn, Alistair. (2001, October). Philosophy of crystal Methodologies. Retrieved

Sept 22 2004, from the World Wide Web:

http://crystalmethodologies.org/philosophy.html

[8]. Control Chaos. (2001). SCRUM software Development process. Retrieved Sept 22 2004, from the World Wide Web: http://www.controlchaos.com/scrumwp.htm

[9].Control Chaos. (2002). What is Scrum? Retrieved Sept 22 2004, from the World

WideWeb:http://www.controlchaos.com/scrumo.htm

[10].Disaster. (2001, July). Recipes for Disaster. Retrieved Sept 22 2004, from the World

Wide   Web: http://www.cio.com/archive/070101/secret_sidebar_2_content .html

[11].DSDM. (2001). Overview: Why is DSDM different. Retrieved Sept 22 2004, from the

World   Wide   Web: http://www.dsdm.org/en/about/overview.asp

[12].Fowler, M. (2000, December). Put your process on a diet software development.

Retrieved Sept 22 2004, from the World Wide Web:

http://www.sdmagazine.com/articles/2000/0012a/0012a. htm

[13]. "Agile Software Development, Principles, Patterns, and Practices," by Robert C. Martin, Prentice Hall.

[14]. "Agile Software Development with SCRUM," Ken Schwaber, Mike Beedle, Prentice Hall.