Saas as a Cloud Service for Agile Development

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Abstract— Software developing company selects process models on various issues that relates to both developing company and customer. Current trend in software development is on flexible to changes and fast releases. This is made possible by agile methodologies with its agility. These methods have uniqueness that they can be used for small as well as big projects. Small projects frequently face economical problems while developing projects. Cloud computing is a simple network access to share resources. A combination of agile methodologies with Saas (software as a services), a cloud computing model provides different services, would help to minimize the economical burden on small projects.

Keywords — Software development, Cloud computing, Software as a service, Agile development, Agile cloud computing.

I. INTRODUCTION

This Earlier, the development of new system or product is done according to the insight of technical personnel and management. But this approach is not sufficient for complex and modern system and computer products. So we need an orderly development process for the development of modern systems. One such approach is software development. It is a process of developing software through a sequence of phases such as identification of required software, analysis and design specification of requirements, software design, programming, testing and maintenance. The process models are used to develop more accurate and formalized descriptions of software lifecycle activities. The software process models use sufficiently rich notation, syntax or semantics for computational processing to get more accurate results.

The traditional model in software development is waterfall model which is modified as v- model. It is termed waterfall since the process flows “systematically from one stage to another in a downward fashion [8]”. It is used by most of the companies to develop software. In waterfall model, the software is developed in sequential manner, first of all the requirements are gathered from the clients, once all the requirements are gathered they are documented and frozen then a design is constructed with this gathered requirements followed by coding, testing and maintenance. Because this is a sequential approach of software development all the requirements has to be specified at the beginning, which is quite difficult for the client, the changes in the requirements is difficult to accomplish in the software once we have frozen the requirements. The problems with this approach are, lots of documentation is required, schedule and cost overruns, and it requires midnight oils as the delivery date of software arrives. Finally the customer may not be happy with the software. But this approach is more logical and easy to understand.

Every step is well planned and next phase starts after understanding the previous phase. Due to the flaws of sequential approach in traditional model, the models like spiral model and agile methodologies came into existence where we have the freedom of changing the requirements in software development. In agile methodologies, the requirements are collected throughout the development cycle. The requirements are continuously prioritized according to the business value. Agile software development methodologies involves iterative development in short cycles called sprints and involves constant business interaction so changes in requirements can easily be accommodated in the development process at any stage. In this work the collection and usage of resources from the cloud for agile software development is discussed.

II. SOFTWARE DEVELOPMENT

Software development process is nothing but a sequential process of gathering requirements, design, programming, testing and maintenance to the deliver right product for the customers. There are two approaches in software development process. They are traditional software development process and modern software development process. Waterfall model, incremental model etc., comes under traditional development process. Agile methodologies such as Scrum, Lean, Dynamic System development methodology (DSDM) etc., comes under modern software development process.
III. AGILE DEVELOPMENT

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 [6]. Highly artistic people who have understood the faults of regular software management processes are using agile development methods in organizations [7]. In agile software development there will be a small group of people getting together to discuss the product in a traditional approach and manages software development products. The requirements can change regardless of the cost. They are prioritized according to the customer’s value by delivering frequently to the customers for each short iteration but not entirely the end product. Customers will get a piece of work in the duration of 4 weeks after that according to users stories the modifications will be done in the product in the incremental manner. This process repeats until the customer satisfied with the end product.

In agile software development all the requirements need not be collected in the beginning of the product. So, the requirements are gathered throughout the development process and continuously they are prioritized according to the business value. This approach is helpful to build the right product which meets the business goals and also reduces the cost and time of development.

Among agile software development methodologies scrum is the most popular framework in the world which is used primarily for developing complex product on the contrary with simple products. We can inspect the product to adapt the functionalities according to the user’s stories. Scrum enables the creation of self-organizing teams the encouraging co-location of all team members, and verbal communication between all team members and disciplines in the project [1]. Sprint is the basic unit in scrum they are many sprints that improves the product among them. The highly prioritized user stories are selected and specified in sprint backlogs. Scrum is widely used for development of small software. There will be a tight budget for small software, so purchasing all the requirements of the software is almost impossible so the resources are borrowed from the cloud.

IV. CLOUD COMPUTING

Cloud Computing is a model of enabling convenient, on demand network access to a shared pool of configurable computing resources (e.g. networks, servers, storage, applications and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction[5]. It provides developing environment, ability to manage the resources, application software over the cloud [2]. The basic need to access the services that are available on the cloud is the internet connection, by this the users can access the services from any place at any time. Google, Microsoft, Salesforce.com are some of the companies that are providing services from the cloud. In cloud computing resources are provided to customers on rental basis, it means the customer pays rent only for the resources they are using. There are different types of clouds, such as public cloud, private cloud, community cloud, hybrid cloud. The user can subscribe to any of this cloud according to their requirements.

A cloud in which services are provided to clients from a third party service provider through the Internet is called public cloud. It provides more scalability and efficiency in shared resources and also provides elastic and cost effective means in deploying solutions. A private cloud is restricted to an organization or specific group. It provides highest degree of control over security, reliability, performance and elasticity. A community cloud is controlled and used by a group organization. This cloud infrastructure is shared among a number of organizations with similar interests and requirements [3]. It offers all the benefits that are present in public cloud along with some more security. A hybrid cloud is an integrated cloud service which uses the combination of public and private cloud and performs distinct function within the same organization. It offers more flexibility and cost efficiency than public and private clouds.

A. Services of Cloud

There are three types of services provided in cloud by service provider. They are Software as a service, Platform as a service and Infrastructure as a service.

Software as a service

Sass in simple terms can be defined as "Software deployed as a hosted service and accessed over the internet”[4]. It represents largest cloud market and uses the web to deliver applications that are managed by 3rd party vendor and its interface is accessed on the client’s side. As the Sass applications can run directly on web browser we need not to download or install the application on individual computer.

By using Saas, streamlining the maintenance and support of enterprises becomes easy because applications, runtime, data, middleware, OS, virtualization, storage, servers and networking are managed by the vendors. Some of the vendors of Sass are salesforce, workday, Google Apps, Cisco WebEX etc., Saas can help the agencies which includes Email and instant messaging, payment processing, identity and relationship management, e-government projects, presence and collaboration, desktop productivity etc.,

As the client uses the applications directly from the web browser most of the vendors provides the facility
of exporting your data and back it up locally at any point of time you need it. The vendors are responsible for storing our data.

**Platform as a service**

Paas provides an environment and platform to allow developers to build applications using tools supplied by the service provider and services over the internet. It provides architecture as well as infrastructure to support application development.

Paas is more flexible because the customer can be having control over the tools that are installed within their platform. By using their tools, one can create a new platform which is suitable for their requirements. The features of the platform can be changed according to the need of the clients, so it is adaptive. There is security for the data, backup and recovery in Paas, so the clients no need to worry about his personnel or his critical data. Teams in various locations can work together on the same application build.

In Paas OS virtualization, servers, storage, networking and the pass software itself are managed by enterprise operations or third party provider and the application is managed by the developer. Some of the vendors of Paas are force.com, Google App Engine, Microsoft Windows Azure.

**Infrastructure as a service**

Iaas are self service models for accessing, monitoring and managing remote data center infrastructures in which a third-party provider contains virtualized computing resources over internet. By using this service the customers can get the hardware that is required for the development of their application.

In Iaas application, data, runtime, middleware and OS are managed by users. Virtualization, servers, hard driver, storage and networking are managed by providers. The benefits of using Iaas scalability, no investment in hardware, utility style costing, location independence, physical security of data center locations, no single point of failure etc., Iaas can be utilized as enterprise infrastructure, cloud hosting, virtual data center by an enterprise. The vendors of Iaas are Amazon Web Services (AWS), Microsoft Azure, Google Compute Engine (GCE), Joyett etc.,

V. CLOUD SERVICES IN SOFTWARE DEVELOPMENT

When software development is done without using clouds or virtualization, the development team use to have only one physical server for development and production. So the server may be busy when you need server to perform some task. At that the developers has to wait until it becomes free which leads to delay in the software development process.

But by using, virtual machines and cloud instances, the development team can have practically an unlimited number of servers available to them. The development teams need not to wait for a physical server. Even though it is busy by performing some task they can use any of these servers and continues their work. If a feature is interesting in the requirements in normal software development we have to wait until the end of current sprint and after that we are going to code and test it. If we use cloud instances we can quickly code it and test it out. The development team need not to wait for the next build or release so the building process becomes more faster and less painful and this approach encourages experimentation.

In agile software development, the delay is experienced in installing necessary underlying platforms such as database software and in provisioning server instances. Cloud computing reduces the delay because of more parallel activities which leads to more efficient and effective utilization of agile software development. By having a large number of virtual machines in its own cloud or on the public cloud increases the speed of integration and delivery in agile software development.

VI. AGILE CLOUD COMPUTING

Agile software development is a method delivered from iterative and incremental development which involves a low-level interaction between self-organizing and cross functional teams. Agile development was deficient of a development platform which supports the rapid development cycles that supports agile methodology. Here cloud computing makes a extensive difference by eliminating the bulky distribution requirement which slows down the agile development process. So there is a good harmony between agile development and cloud computing. The cloud services provides applications to users whenever they need and to what extent they need, the basic requirement of getting access to cloud services is internet connection. The users can access the updated versions of application from the cloud immediately when they are made available on cloud, reinstallation of new version is not required, so that the developers can get feedback for that application quickly and they can make changes in the application if required. Whereas by using traditional approach software distribution is a mind-numbing task which needs reinstallation and supporting teams help. To get feedback from users it takes months or even years of time.

The main aim of agile methodology is to reduce the delay in software development phases. By combining agile software development with cloud computing the benefits are
Unlimited number of servers is made available, by cloud computing, virtualization to precede the development.

As there are more number of servers the speed of development process is accelerated and delivered in time.

Waiting for next release is not required.

Development, coding and testing becomes faster so that innovative thoughts can be easily incorporated at any point of time.

A. Saas from Cloud

The applications of SaaS are also called as on-demand software or hosted software or web based software. Newly established, small IT companies will have tight budget and their requirements changes at different phases. Buying and maintaining all the software and resources required for the development for the product and maintaining them is a big task. SaaS cloud computing has multitenant architecture which delivers desired applications to the end users through internet. Some big multi-national companies such as IBM maintain their own cloud and provide services to others.

Ad-Hoc Level

It is the first level which is also known as customer level of maturity where unique customized versions of applications are present in the server. It doesn’t require system administrator and this level is useful for converting existing client server architecture.

At this level each tenant has his/her own modified version of a hosted application and the an instance of the software application is made to run on host’s servers by the tenant. The architecture at this level is similar to that of traditional line-of-business software sold earlier on, where multiple clients or tenants use single instance running on the server within a single organization but the instances running on the host are fully independent of each other.

Configurability

This is the second level of maturity which provides flexibility to identify different users using the same services or applications from the cloud. By knowing this, the cloud providers can maintain common core code of application regardless of end users and then they can allocate the resources to end users according to their demand.

This level falls 2nd in SAAS maturity levels where all instances employ similar code implementation but each instance is personally adapted for each tenant. To meet the requirements of the customers the SAAS vendors provides in-depth configuration options which permits the customer to change the appearance of the application as well as its behaviour towards its users. Every instance remains completely isolated from the others especially at code level.
Multitenant Efficient

This is the third level of maturity where a single resource is shared by hundreds or thousands of tenants, nothing but end users by each and every individual user can be differentiated according to their data or need.

This is the 3rd level in SAAS maturity where client are served by the vendor with personalized user experience, configurable metadata to provide unique, and unique feature set by running only one instance. By this mechanism server space need to accommodate more number of instances is reduced to large extent. Customers data is safe-guarded with the help of security and authorization policies.

Scalability

This is the last level of maturity. In this level by conduction optimizing locking duration, statelessness and sharing pooled resources, the application resources are used effectively.

This is the last level of maturity where the vendor hosts several tenants on a load-balanced identical group of instances. A SAAS system can be scaled without changing architecture the application because the client needs can be fulfilled by adjusting the number of instances and servers on the backend.

B. Advantages of SaaS

- Low cost and overhead
- Pays rents only for the resources that are being used.
- Services can be access any where
- Offsite deployment
- Decentralized and customizable
- Scalable applications
- Easy maintenance
- Maximum efficiency
- Highly stable and common base code.

VII. CONCLUSION

With the adaption of SaaS service for agile development improves efficiency with respect to reduction of economical feasibility, increasing technical flexibility. Adaption of required resources done based on use and return method so that in development new kind of solutions will be innovated.

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REFERENCES


[8] [Online]: http://www.waterfall-model.com/