CHAPTER 5
DAT -AGILE COMPUTING

5.1 INTRODUCTION
Agile methods promote adaptive planning, evolutionary development and delivery, a time-boxed iterative approach, and encourage rapid and flexible response to change. Cloud computing is a model for enabling a convenient, simplified, on-demand network access to a shared pool of resources such as networks, servers, storage, applications, and services. A combination of the Agile methodologies with IaaS (Infrastructure as a service)-a cloud computing service model, would help in betterment of delivery of the agile projects with a shift of workload focus from maintenance of infrastructure to innovation.

Agile methods promote adaptive planning, evolutionary development and delivery, a time-boxed iterative approach, and encourage rapid and flexible response to change. However; given in a scenario if the projects are budget constrained, are to operate with high capacity servers with very good performance capabilities and having a fluctuating demand on the infrastructure during various phases; the timely unavailability of infrastructure can become a constraint and sometimes would be a major setback to the agile teams. Given the dynamic nature of the teams; the infrastructure should be available within a short notice and due to the budget constraints the resources should be released as and when they are no more required and procured as and when required.

In this Chapter we propose the usage of Infrastructure as a Service (IaaS)-a Cloud computing service model on to the agile projects. To address the problem of the timely infrastructure availability, scalability, performance within the tight project execution schedules and budget constraints of the agile teams; we can utilize the cloud computing model effectively to reap the benefits provided by it. The usage of cloud computing on the agile team enables on demand access to the required pool of resources with minimal effort, ease of
use and cost-effectiveness to the team and caters to the better execution of the agile projects.

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Cloud computing is a model for enabling a convenient, simplified, on-demand network access to a shared pool of resources such as networks, servers, storage, applications, and services. In Cloud Computing, the resource sharing is in a pure plug and play model and it dramatically simplifies infrastructure planning for the organization giving the advantage of ease-of-use and cost-effectiveness of the resources. Cloud computing has the potential to transform a data center from a capital-intensive set up to a variable priced environment. The idea of cloud computing is based the principal of 'reusability of IT capabilities'.

In organizational perspective; the business needs to be agile to be competitive in the market—to respond to customers, partners, and suppliers quickly in the most quicker and efficient way possible. Cloud computing helps improvise the responsiveness, to quickly provision the resources to handle unforeseen customer demand. It further enables to release unwanted resources any moment to achieve cost-effectiveness. In Certain cases; the struggle to keep server capacity in line with business need is always around. It would slice the profits if you don’t have enough capacity when the situation needs it. And it would cut into your profits if the system is build up with lots of unused resources in advance of the business need. Fluctuating capacity needs could also cause a situation of running out of required resources just when you need those most, hindering the ability to respond to the needs of customers. Also, having a set of idle, expensive servers that aren’t contributing to the project needs is a burden to the organization and is a waste of investment. If the challenges of fluctuating capacity needs and server management coming on the way to act on business decisions, then cloud computing is a way to address the
performance needs. Cloud services enable the movement at the pace of the ideas. The cloud lets you scale capacity and entire platforms quickly. Cloud services can provide incremental bandwidth of network access on demand to satisfy the customer’s needs. The cloud allows creating a new computing environment quickly and pay only for services that are being used. Cloud is also ideal for random use, such as demonstrating product capability to a customer, or for seasonal usage of resources such as seasonal campaigning etc. The risks arising out of unavailability of the infrastructure can be handled by the cloud and can be a part of the Risk management in Agile

Managing servers can be a very resource-intensive task and diverting valuable IT time to data center chores which could compromise on the strategic projects aimed at driving new business opportunities. At the same time, servers can be costly to buy, house, and maintain. They take up a lot of space and business often must invest in a separate facility to hold them. The capital expenditure involved in housing and maintaining this could alter your business priorities and change your ability respond to customer needs. In such a situations leveraging the cloud computing capabilities would help the business to continue and focus on the business priorities. The cloud computing capabilities can also be leveraged to handle the nonlinear usage of resources in various phases of a project for e.g. Minor use of the resources in the beginning of the project, and massive use at the end. The characteristics of Cloud are as below

- On-demand self-service
- Broad network access.
- Resource pooling.
- Rapid elasticity
- Measured Service
5.2 SERVICE MODELS

The fundamental models of cloud computing are listed as below

1) Software as a Service (SaaS)

Software as a Service is a delivery model where the software and the associated data is hosted in a cloud environment by a third party cloud service provider (CSP). Typically the user’s accesses the software on demand using a browser on a computer or mobile device. In this model the user does not buy the software but the CSP licenses the SaaS to the users of a company or agency, which then enables multiple users to access the software. For instance highly scalable internet based applications such as Google Docs, salesforce.com are hosted in the cloud and they are offered as services to the end user.

2) Platform as a Service (PaaS)

Platform as a Service is a delivery model where a CSP provides an online software development platform for an organization. The users or organizations developers use the CSP’s computing environments, tools, and libraries to create, test, manage, and host software applications. By moving the entire development platform to the CSP, organizations can lessen the cost and management burden of application development. For Example AppEngine from Google, Force.com from Sales Force, Bungee Connect, LongJump, WaveMaker provides the platform for designing, developing, building and testing the applications are provided by the cloud infrastructure

3) Infrastructure as a Service (IaaS)

Infrastructure as a Service is a delivery model where CSPs provides the necessary hardware and software upon which a user’s can build a customized computing environment. The CSP typically provides an unmanaged
environment that enable users or users of an organizations to have any resources it needs to get installed such as the operating systems, software bundles, storage capabilities, etc. The organization retains full control of the computing environment and is responsible for configuring and maintaining the operating systems and associated applications and resources. The CSP, however, is responsible for maintaining all of the physical equipment. Services like storage, database management, and compute capabilities are provided on demand. This is a pay per use model. Example: IBM smart cloud, Amazon, Joyent, GoGrid and FlexiScale
5.3 DEPLOYMENT MODELS

Private cloud

Private clouds are built exclusively for a single enterprise. They can be hosted either internally within one's own data center or externally with a cloud provider.

Community cloud

Community cloud shares infrastructure between several organizations from a specific community with common concerns (security, compliance, jurisdiction, etc.). The cloud can be managed internally or by a third-party and hosted internally or externally.

Public cloud

Public clouds are owned and operated by third parties; giving each individual client an attractive low-cost, “Pay-as-you-go” model for sharing the infrastructure.

Hybrid cloud

Hybrid Clouds combines both public and private cloud models.

The below listed are some of the Cloud computing capabilities

- Dynamically scalable infrastructure
- Self Service Management
- Pay per use
The below listed are some of the Cloud computing Cloud computing Benefits:

- Reduced cost
- Leveraging the scalable storage of the cloud
- Flexibility
- Resolves Performance Problems

5.4 AGILE COMPUTING

In Agile development software is created by emphasizing short development cycles based on fast customer feedback. The methods are flexible enough to embrace change all the time and are capable of adapting to changes quickly with in less the development time. Agile methods have minimal planning and do not involve long-term planning. Agile if provided with a crucial component- a development platform that takes care of all the infrastructure requirements which supports the rapid development cycles, can work towards the betterment of the agile project execution. The pace at which the customer requirement changes or the agile team responds to change at times would demand an availability of the infrastructure such as servers, network, storage etc. within short durations. The teams cannot wait for weeks to months for the infrastructure. Moreover the iterations with in agile methodologies would vary from 2- 4 weeks. So, the demand for infrastructure should be addressed in hours to few days rather than weeks to months as in traditional methods. If the projects operate in a strict budget constraints it would be more difficult to procure high end servers, storage etc. The unavailability of the infrastructure required would impact the fast moving, rapid developing agile teams to deliver the projects. Also using cloud computing would help workload focus from maintenance to innovation
So, the difficulties on the infrastructure front due to any of the reasons can be overcome by switching on to the cloud computing. We can say that there would be definite merit of using both the Agile methods and using the service model Infrastructure as a Service (IaaS) of the cloud computing together which we term it as Agile computing. Agile with cloud computing infrastructure as a
service (IaaS) would provide rapid access to secure, enterprise-class virtual server environments and would be well-suited for development and test activities as well as other dynamic workloads that the agile team performs. The pay-as-you-go model minimizes the time and initial capital outlay needed to ramp up IT projects. Thus the combination of agile methodologies and cloud computing service model – IaaS (Infra Structure as a service) would collectively leverage the merits provided by each of them and works towards the betterment of delivery of the agile projects.