CHAPTER 2: REVIEW OF LITERATURE

Cloud computing is a service based rapidly increasing technology based on the virtualization concept due to its popularity as it offers apparition to its end users by providing the infinite computing resources with less cost as this technology works on the principle of, "Pay as you use service" or "Resources on demand". This principle allows the users to use resources according to their need & pay accordingly thereby saving of resources thereby also providing reliability, scalability, availability for the resource utilization. Adopting this technology has led the users to think a lot as with the new invention this technology also brings out new challenging issues that need to be taken care such as data security, leakage prevention. The scheduling is the systematic execution of process in an efficient manner so that resources can be utilized in an efficient manner & it has major role in fulfilling the end users QoS requirement of cloud computing users & thereby reducing the cost more frequently. Mobile computing is a generic term which is used reference to a large variety of devices which allow the users in accessing the data & information from anywhere at any location through the use of mobile devices. Mobile has changed the life of every individual as this allows users to access anything irrespective of any place & only an active mobile internet along with the specific hardware is required. The mobile computing has the drawback of lesser availability of bandwidth, limited resources slow internet speed, data lost, security, authentication & hence the coverage is also limited. With the rapid advancement in the technology & evolving cloud platform it is very essential that mobile computing needs to be merged with the cloud technology by means of proxy & other means thereby a new emergence occurs called as the mobile cloud computing. The main disadvantage of computation over mobile is the connection loss, lesser availability of bandwidth & limited resources. While a problem is still there in connecting mobile devices with an existing web services because: 1). Mobile devices have limited resources such as CPU power, screen size, memory, and durability. 2).The mobile clients are also not supported in the recent cloud web service network. The various challenges as discussed above can be overcome by the architecture that has been proposed here in this section for the mobile cloud computing to interact with the mobile devices with the cloud computation. The MCC also includes the architecture of both the mobile client and a middleware design where the middleware acts as a proxy between these two which is hosted on the platform of cloud computing platforms due to which the mobile clients
have an access to the Cloud services hence there is regular improvement in the interaction between mobile clients and Cloud Services such as cashing, optimizing etc. All these drawbacks have been taken care of & focus on the proposed architecture for the mobile clients using the middleware which additionally provide the benefit of service mashup as well as the protocol transformation.

(Malik A, Nazir M M (2012)).

Currently researchers are studying & implementing the job scheduling system based on QoS requirement. In the computing technology over clouds system there is a significant shift of the workload as the servers need to be in response all the time due to regular demand of the services by the customers on the cloud and the service provider also need to keep the track of providing the necessary resources to its client and make their data confidential. These heavy lifting of the work loads are not handled by the normal computers so the dedicated high end servers are required for handling and lifting these loads of too much running applications. There is a drastic decrease in the demands of the software and the hardware as the virtual machine concept removes all that as the cloud requires special machinery and different software for running the cloud applications. Normal computers and the software are not of worth so the high quality large scale. (Mathur P (2010))(Padhy R P (2011))(Peng J, Zhang X (2009))(Peng Z (2010)) (R Chow, Golle P (2009)).

The authorities are expecting that global market will comprise of the thirty two percent of the cloud technology share which includes the amount of 2000 in the net five years & this will further increase the cloud share in the market at a rapid rate as seen by the researchers. (Risten T Part (2009)).

A priority based scheduling algorithm is shown in which the customers are allotted the priority according to their arrival in the queue & the prioritized customers are categorized into different priority queues. These prioritized customers have guaranteed Quality of Service (QoS) by the cloud computing by means of reducing the waiting time & increase in arrival rate of new jobs thereby turnaround time also gets better. The priority to the customer needs to be done on the basis of selection probability which is introduced according to which the cloud metascheduler chooses the next query for execution. The priority queues are modeled as
M/M/1/K/K queues and an analytical model is developed for the calculation of selection probabilities. A model has been developed whereby user can demand QoS for his request. When a user comes to the website, he opts for a particular request/task & accordingly priority is assigned. The system provides him the option for prioritized/non-prioritized service.

A prioritized service guarantees the QoS in terms of lower response time. Every request/task has a pre-specified priority in the system. If the user opts for the prioritized service, system notifies the user whether the user can be guaranteed the QoS or not. Every request/task has a pre-specified priority in the system. If the user opts for the prioritized service, system notifies the user whether the user can be guaranteed the QoS or not. In case the system can provide QoS then he/she will be served with that pre-specified priority as per the availability of server otherwise he/she is served as a non-prioritized user after notification. In our model, we have categorized the requests into k different priority sets. A separate queue for each priority set (queues 1, 2... k) and one queue for the non-prioritized users (queue NP) is formed. Hence, there are total k+1 queues in the Cloud Computing system. At the server side, the requests are fetched for processing from the k priority queues according to a particular selection probability p_i (i=1, 2,..., k) which helps in ensuring QoS. These scheduling algorithms are useful for the every aspect of the cloud computing including the architecture, service platform, security & other aspects. The NP hard problem based on the job scheduling phenomenon is used for measuring the complexity & randomness as a large number of research work has been done on the scheduling strategy. (Sabahi F (2011)).

The most important role of the cloud service provider is to provide efficient resource utilization which includes comparatively less cost as this leads to optimization of resources. (Sadhasivam S e.t Al (2009)).

There is a need of improving the resource utilization rate & the response time of the system so the author has proposed an algorithm based on the priority of jobs alongwith FCFS termed as PB-FCFS which helps in combining the backfilling as well as the scheduling based on priority & finally considering the recycling of resources the task accomplishment (Scacchi W (2001)).
It has the focus in delivering of reliable, fault-tolerant and scalable infra for the hosting of application services based on the network & internet hence an implementation based on the efficient QoS requirement which is relevant for meta-scheduler and Backfill strategy which is weight job scheduler with virtual machine. (Semnanian A A, Pham J (2011)).

The service developer always want from the service provider to provide the capability for dynamically allocating and managing the resources in the response of changing the patterns of the demand in the real time. Ultimately the service providers are pressurized to architecture their infrastructure so as to enable the end to end real time visibility and managing the resource for the dynamic approach of resources as well as managing these resources with the fine grained control in order to rescue the total cost of ownership thereby improving the agility to an extent. The various existing algorithms for the scheduling purposes are available specially related to backfill & priority backfill algorithms. (Sarathy V, Narayan P (2010)).

In the cloud computing technology there a lot of workload shift on the computers in the cloud so the local computers need not have to do all the heavy lifting when we talk of the running applications instead the network of computers on the cloud specially dedicated are involved in the workload that lead to decreasing of hardware & software demands and the user need to run the cloud interface on the computer itself which is quite a simpler task for the client or the consumers. (Mathur P (2010)).

The authors discuss the similarity & relationship among the cloud computing & grid computing, identifying the gaps, an existing standards were being overlapped and identification has been done for the means of using grid and cloud technology thereby also exploiting is done for improving the efficiency of NGN resources and also offering of new “data” services to consumers. This will also enable the telecom operators to manage their resources in a dynamic and optimal way by a single platform. (Caryer G et al (2009)).

Component based software engineering is based on the selection of components that are quite a difficult task. CBSE is related with the assembly of pre-existing software components that leads to a software system. The authors have proposed an approach or criteria for the definition of evaluation mechanism of existing components as a particular software code is a
component. The components are selected on the basis of the price of the components which are calculated on the basis of the quality attributes of the component. (Kaur A et al (2010)).

We need the computing platform that is based on the policy of “Pay as you use” and also leads to fuller CPU Utilization with more security. So the new concept or computing platform emerges into the market that is known as the cloud computing. A strong degree of equivalency among the FP and SLOC which is based on two-step work-effort validation procedure is firstly defined by using FP for estimating the "SLOC,". (Allan J. Albrecht (1983)).

From among the existing techniques of software development it can be seen clearly that the development based on the component approach will enhance the technology trends and will help in the reduction of cost & further development of software from the existing software system. (Fernando L Capretz (2005)).

Software Verification and Validation (V & V) activities are used to check the software against its specifications as required and demanded by the client. In traditional software system the V & V process could be done in close cooperation with the customer to meet the specific requirements. During the development of the software components, V & V becomes a bit more complicated task as all the components need to be done V & V individually first & then in combination of various components so that every requirement could be fulfilled. Components are developed for reuse purpose & are usually developed for the open source market hence the components need to be specified & validated more thoroughly. Keeping these things in mind the authors have proposed the V & V approach for the components including the component based development approach (Tomar P et al (2010)).

Program slicing a software engineering concept has helped a lot to the programmers for understanding the foreign code & is also useful for debugging. The various principles based on the decomposition characteristic have been presented in order for the changes prohibition which will help in interrupting with the unmodified components. The changes occurring on the regular intervals can then be combined back into the original program in a linear time. The changes can be tested by the maintenance team in the component with the promise that it will not lead to be linked with the other component hence a new software maintenance process model has been
introduces here which also helps in the elimination of regression testing need (Gallagher K Brian et al (1991)).

The process of software engineering focuses only on the software development & is now able to reorganization so as to achieve the software more quickly with low price budget hence to adopt the design need based on systematic software reuse is very important. Reverse engineering implies the evaluation of something in order to understand its working so as to duplicate or enhance it. The re-engineering objective is maintaining the existing functionality & and focusing on the functionality to be added without disturbing the existing functionalities. The whole development process from conceptualization till the operation is called as the SDLC process in software engineering. The essence of software re-engineering lies in the fact that it helps in improving & transforming existing software in order to understand & control. The software re-engineering demand has increased instantly at a great level to an extent such that the traditional software systems have become obsolete in terms of their architecture, the working running platform & their suitability as well as stability so as to support evolution for supporting the needs that gets changed (Linda H. Rosenberg (2009)).

The authors categorize & examine a number of methods or approach for the development of the software system. Then this process is then followed by a iterative models of the software development which is currently useful for the organization of software engineering projects as well as technologies (Scacchi W (2001)).

The author has presented a conceptual foundation for the software re-engineering approach which is a very important phenomenon. The foundation based on various searching & research is also comprised of various principles & properties & the principles that underline the reengineering techniques & reengineering assumptions. (Eric J. Byrne (1992)).

The problems has been characterized by the authors here alongwith it’s the working impact on the modern technology adoption. Additionally the author has discussed on the way the existing research has been combined herewith & it also has the potential to alleviate many of the concerns impeding to the adopting scenario (Chow R et al (2009)).

The author while keeping in mind of the amazon ec2 cloud service medium has shown that it is possible to map the existing internal cloud infrastructure among the various existing one
& also identifies that where the particular virtual machine likely to reside at because it seems very important in judging all these things and then instantiating the new virtual machines until the one is placed co-resident with the target. (Risten T. Part (2009)).

The author discusses the new risks & various factors that both image publishers and image retrievers of a cloud's image repository. In order to address those important & crucial risks they have proposed an image management system for controlling the access to pictures, tracking the images & provide users and administrators with efficient image filters as well as the scanning devices that can easily identify and repair security violations (Wei J (2009)).

The authors has presented the architectural principles and deriving the interconnected modules so as to form a reusable & customizable architecture of this technology which is an open source. (Jie L. Zhang et al (2009)).

To differentiate the critical difference between the clouds computing technology & the traditional computing technology the author has taken care of problems. This comparison allows users in better understanding the cloud platforms of different nature & choosing according to need. The author has proposed a P2P architecture of cloud so as to improve the infrastructure of the cloud computing which consists of Center P2P Network and Side P2P Network. The center P2P which is helpful in replacing Master of the centralized architecture which can avoid bottleneck of the centralized architecture, as well as it also provides service of computation to the clients by using the Center P2P server and thereby the access to the system has been increased as the number of customers rises to a good level. By analyzing and the evaluation this system has much better availability as well as scalability. (Peng J et al (2009)).

The authors try to reduce the confusion for the users in order to understand the difference between the cloud and the other computing technology & thereby differentiating both the technical & non-technical issues regarding the same so that the difference can be easily identified by the business organizations. (Armbrust M (2010)).

The idea behind this technology has helped in proposing a latest computing dimension where everyone from single users to communities with the enterprises by sharing the share resources and services in a transparent way and, on the other hand, have access to and use such resources and services adaptively to their requirements. Such an enhanced concept of Cloud,
enriching the original one with volunteer computing and interoperability challenges, has been proposed and synthesized in Cloud Home (Cunsolo V. D et al (2010)).

The author has proposed a novel approach based on the reengineering by means of developing ontology for the business enterprises & then by the distribution means the enterprise software ontology for decomposing enterprise software into the potential service levels. Ontology development is a means in software which also includes strategy based on the 3 steps. Out of which the first is useful for the process development & which is further supported by the reverse engineering as well as the transformation modeling techniques. The second one says that research based on engineering is the basis of the integrating among the ontology. Last one is based on the deployment of enterprise software through the activities based on the software reengineering activities. (Zhou H et al (2010)).

Being a latest technology the author has taken in consideration these things & has pinpointed the Challenges and issues of Cloud computing. Firstly two inter related computing paradigms namely Service-Oriented Computing and Grid computing has been discussed alongwith their relationships with cloud technology. Then the challenges related to the adoption of Cloud computing technology has been in discussion. Finally a highlight on the Cloud interoperability issue has been discussed as it further needs the research and development means (Dillon T et al (2010)).

The author has introduced field related to the application in the merit of cloud computing so that user’s high level equipment is not needed hence reducing the users cost of investment. It also provides the data storage center that is secure & of big sizes hence the users need not be panic in maintaining software hardware and computers for the virus treats. It also helps in the realization of the data share by different hardware equipments & thereby analyzing the questions & various queries thereby putting forward some solutions. (Zhang S et al (2010)).

The author has proposed the characteristics of cloud computing which make it and distinguish it from other research areas (Gong C et al (2010)).

The most recent cloud computations and the implementations have been done using the traditional computing phenomenon as a brief survey of current cloud computing architectures has been also discussed herewith thereby also discussing the various trends & issues which occurs in
the implementation of current cloud technology and also hence a service-oriented cloud computing Architecture (SOCCA) has also been discussed herein in order to interpret the clouds with each other. (Wei-Tek Tsai*, Xin Sun (2010)).

The encompassment can be done by the computing architectures so that the users are able to use the softwares & the other devices for invoking various functions in the cloud. Another issue with the analyses to date is the reflection which is inadequate of the risks that users are with the subject of using the cloud services. (Clarke R (2010)).

The service developers want the resources to be allocated dynamically & resource management with the response of demand changing patterns in the originality with full control in order to lessen the total cost of ownership thereby agility is improved for the service provider. Lastly a lot of pressure is on the cloud provider in order to design the infrastructure in order to enabling a real-time end to-end visibility and resources & managed dynamically (Sarathy V et al (2010)).

The Point to point architecture based on the cloud has been discussed so as to improve the cloud computing infra which also contains center P2P Network and Side P2P Network.

1) **Center P2P**: It helps in the replacement of the master of architecture which is centralized & bottleneck of the centralized architecture can be avoided therof & also provide computing service to the client using this medium & increases volume of customers to access the same.

2) **Side P2P Network**: It is the replacement of slave of the centralized architecture which helps in providing storing & computation facility thereby the transmission of data and the performance of the system can be improved very effectively & efficiently by means of lower cost. (Peng Z (2010)).

The application field based on the merit of cloud computing has been proposed herein such as user’s high level equipments are not needed thereby reducing the user cost & providing the data storage center which is secure and dependable so the unfortunate things need not be done by the user including the storage of data destructing virus. (Zhang S et Al (2010)).

Every job needs to be executed properly for the efficient utilization of resources which is the utmost requirement in the cloud platform. Job scheduling has the basic & mostly used
algorithm called as FCFS followed with SJF, Round Robin, Backfill. The Job scheduling is very important & typical task in the modern technology of Cloud Computing. The scheduling focuses on executing the jobs in order to complete the particular task timely & efficiently. The SJF algorithms executes the shortest job among the various jobs but if the two or more jobs have the same burst time in the SJF so by default the FCFS is used instead. FCFS algorithm is the default & commonly used but it is not efficient in terms of resource utilization as the response for the job execution is much higher. In order to get advantage to each job for executing we need that a time slot namely the quantum needs to be allotted in the algorithm & this is implemented in the round robin algorithm where each job has the specific time slot for the execution & giving the chance to the other jobs to execute. The jobs are ignored due to large burst time with reference to the runtime can proceed in running after the timeout if other jobs are not been allowed for delaying in executing so in this case the jobs need to be prioritized by means of priority based scheduling algorithm & moving into the modern computing technology much advanced algorithms were developed namely the easy backfill & conservative backfill algorithms. Backfill algorithm focuses on optimum utilization of resources with improved waiting time by means of executing multiple jobs at a time by in the order of their arrival. A technique based on the scheduling for on the load balancing of virtual machines has been proposed which is co related with the genetic algorithm & can influence by current data that it may help in computation of the influences which will effect the system after th virtual machine platform has been deployed & finally the lesser effectiveness can be choosen thereon so as to achieve the best balancing based load thereby ignoring migration dynamically into this computing resources. (Jin hua Hu, Jian hua GU Et Al (2010)).

Various methods has been in adoption so as to handle concurrently the various jobs thereby waiting & execution time alongwith the interaction time with the erver gets reduced a lot. A differentiation will be made by these methods by the consideration of same number of jobs, but varied the environmental conditions may vary so the result would be computed the problems like resources virtualization, queuing techniques etc. has been discussed here alongwith the main convergence of imprtant points. These imprtant aspects will be closely researched, examined and explained with the proper descriptions (Gupta P K. et Al (2010)).
Cloud based technology has the objective of constructing of a perfect system with the very powerful & efficient computing capability by means of the entity which is lower in cost & also using the business models with advancement including SaaS, PaaS, IaaS so order to provide the computation means to the users which are powerful in nature. The authors have discussed about the service model & the background medium of cloud computing as well as regarding the problems & challenges of cloud computing like the security, hacking etc. has also been discussed (Yang J (2010)).

The authors have also discussed a layered framework for secure clouds and then focusing on two of the layers, i.e., the storage layer and the data layer. In particular a scheme for secure third party publications of documents in a cloud has been proposed & finally XACML implementation for Hadoop has been shown up with respect to the security (Hamlen K (2010)).

The authors have explored issues which are multidisciplinary for searching from the cloud service provider view, consumer of cloud & the authorities related to the third-party including Govt. An imrtant research direction in cloud security has been discussed in computing area which is trusted by nature, Privacy Preserving Models & Information Centric Security. Finally the steps neded are used at high level security preparedness can be assessed for a business application to be moved into the cloud (Sengupta S (2011)).

The history of the cloud computing has shown that this technology has never come up earlier & it has been expected from the study that this will capture the most part of market in few years which has already been started & the core IT industries are adapting the technology. Microsoft has also introduced the Azure platform for providing service, Google drive is also a cloud means & much more. This technology has also been pin pointed for the differentiation among the service provider & cloud service provider as these are two terms. Service provider is the term used in the distributed computing technology while the other one signifies the cloud computing means. The reliability, availability, and security issues for cloud computing has been proposed including the RAS problems, thereby a feasible and available solutions has ben proposed therein. (Sabahi F (2011)).

The computers have been designed such that at a time they are able to run only a single operating systemalongwith its applications leading to the underutilization of resources. So the
technology named as the virtualization which helps in enabling the option of running multiple & virtual computers on a single physical system. Various methods for supporting virtualization techniques has also been discussed alongwith its impact on the computer system has also been estimated. (Semnanian A A et al (2011)).

The development based on the cloud is a typical challenging task for various projects of software engineering especially for those where the development with reusability is needed. The speed of developing the software services will tend to be low until the cloud computing reusability model is considered an important means of software development. The cloud computing alongwith the CBD known as CCR model and enable affecting security management from a business perspective who is responsible for security, transparency of cloud service provider, conduction of penetration tests, impact of bankruptcy of service provider, gathering of forensic evidence in case of a breach, vulnerabilities of hypervisor, problems of cloud architecture, indirect expenses. The issues regarding the security has been discussed which also involves with cloud computing and idea of how to tackle these issues. (Lumley R A (2010)).

SaaS comprises of largest search engine namely google & the social networking site called as Facebook so in order to support the large number of user requests for accessing these sites by various devices such as personal computer, mobile device, and smart phone they have proposed an analysis of the cloud backend in order to support upcoming means in large medium. (Yang B W et Al (2011)). (Barreto A et al (2011)).

Earlier computing technology called as distributed computing does not guarantee the data confidentiality but this technology provides higher security benefits to the end users. This is led by the cloud service providers with different services being offered such as Software as a service, Hardware as a service, Platform as a service, Testing as a service & Infrastructure as a service. These services uses the resources on the same principle & it is the responsibility of cloud service provider to keep the user data highly confidential from the other users as well as timely providing services to the end users due to the third party involvement. The key research and challenges have been discussed & the best practices have been offered in order to provide services to the service providers as well as organizations are hoping for the cloud service leverage. (Padhy R P (2011)).
The usage is made by taking the existing code & thereby as per the requirement changes are made so as to achieve the required goals. There are 5 phases of a typical SDLC: 1). Envisioning 2). Planning 3). Developing 4). Stabilizing 5). Deploying. The software that needs to be developed to be implemented on the cloud computing platform requires the fulfilling the needs of the cloud provider i.e.: what kind of s/w is to be developed & the software Developer develops the software in the general phenomenon for general use. To develop the software to be implemented on cloud computing platform the software Developer must be guided at every level including from initial phase of planning till the last phase. The interoperability issues occur as these phase does not involve the cloud service provider due to which software development was typical so in order to remove the drawback the cloud service provider was integrated with the service provider at every phase of the SDLC & the roles separating these two in detail has been discussed in the respective chapter with the introduction of cloud metric for the estimation of the cost in the software development in case of cloud & focusing on providing framework for integrating the cloud provider with the software developer for developing the software as per cloud platform.

A development based on the cloud computing is a challenging task for several software engineering projects especially for those which needs development by the re-usability. Until Cloud Computing Reusability Model is considered a fundamental capability, the speed of developing services is very slow. The author in this paper spreads cloud computing with component based development named Cloud Computing Reusability Model (CCR) and enable reusability in cloud computing.

This paper comprises a reusability model based on cloud computing. The cloudsim simulator is used for validating the model and the results shows that cloud computing based on re-usability principle helps much in the minimization of cost as well as time to the market as it involves less effort since an existing code needs to be re-engineered hence the requirements needs to be re-analysed and all the phases are followed again. A reusability technique based on the software re-engineering technology has been mentioned where the existing software is being used in order to alter the code & make it suitable as per the needs. The cloud computing reusability model using the simulator called as cloud sim has been proposed & validated and the results shows that this approach is very effective in reduction of the cost and time taken to market (Singh S P et al (2012)).
These two different terms provide the platform to the end users to use the different technologies. Cloud computing may be termed as combination of utility computing & distributed computing. The title of the thesis, “A Component Based Re-engineered Architecture for Cloud Computing has been detailed by taking into consideration of introduction & literature survey in detail as well as various issues & challenges of this technology related to the scheduling of jobs, interoperability issue, mobile computing in cloud, component based repository model & the model of cloud for the e-governance. The author briefly describes the differentiating points between the traditional re-engineering & the emerging reengineering technology named as hybrid-reengineering which helps in simplifying the typical tasks. The study shows that how the maintenance is have the effect while taking the help of given software engineering approaches. A brief analysis of various possible risks & their impact alongwith the mapping with various attributes are shown & thereby reducing the risks by using the hybrid reengineering technology (Tarar S et al (2012)).

The software architect who is well-known in markup language i.e.HTML can create the design and further convert into implementation phase. Here the lack of design time will be reduced by a special technique called as Re-Engineering. After converting the application, the Organization has to maintain the architecture of their work process. At that situation this Cloud Computing is used to integrate into our components. The cloud computer has many factors that contribute to the success and survival of the company during transition, one of them is to assess learning curves of many different individuals. (Kirubakaran E. et Al (2012)).

The issues are taken into consideration as being the core ones & hence the distinction as well as detailed study of each topic is of utmost important. In the software development life cycle only the service provider of the distributed computing were involved for the development of software which was quite an easy task but with the increasing rapidness in the technology & upcoming of the re-usability, re-engineering , hybrid engineering & the component based programming has led to the reduction of cost of the resources on the heavy way.Cloud computing tends to be a very imprtant platform for the organizations in order to build their infrastructures upon. If the organization want to migrate from the traditional to the cloud based technology (Malik A et al (2012)).
The exact estimation of the cost of project is an essential requirement for making a project based on the re-engineering technology. The systems which are in existence are usually reengineered because it is cheaper to reengineer them than to redevelop or to replace them. (Sneed H M (2005)).

There are various SDLC models such as Waterfall, Incremental, Spiral, RAD, XP model & Internet Speed Development model. The cloud computing technology needs the usage of professional models of software development. These models tend to be very costly as the software is developed from the scratch. We know that the testing & maintenance comprises of 40% cost in the project. The concept of reusability occurs which implies reusing the existing software/ component by modifying it as per needs & finally obtain the required software hence reducing cost in every respect. The component based software engineering talks of an important concept known as a component which is basically a module exists in the specific repository & can be re-used for developing the new software. A model has been proposed by using cloud component repository from where the components can be taken up for the reusability which also overcomes the drawback of traditional software development involving higher cost. Government is well aware of cloud & it’s potential. But people are just waiting to get it more matured & real one. The four very crucial pillars of E-Governance:

1). Connectivity:- It is a requirement for connecting people to the respective government services.

2). Knowledge: - It refers to as the knowledge of information technology & there is a need for skilled engineering professionals to the government who can easily handle the e-governance very efficiently.

3). Data Content: - It allows sharing of knowledge or information by the internet medium which all exists in the database.

4). Capital: - It means the money used by government for providing the services or to that sector of the economy based on its operation whether in private or the public partnership. Being a lot of problems & errors in the project the users analyze that it was very simple to operate the manual system. With the positive aspect an e-governance deployment framework using the cloud computing security measure is proposed with respect to the software development life cycle
model. This model can also be incorporated with the e-governance deployment framework using the cloud computing.

A new term in the CBSE called as a component is brought into picture. Component simply implies a piece of code that is already developed and is reusable for the purpose of re-engineering.

The term component is now being probably be seen as one of the most crucial overloaded and hence more confusing terms for the software engineering of modern scenario and the documentation related to .NET has its own fair share of inconsistency for the concept handling but the main confusion arises in the decision of drawing a line between the class that is used for the implementation of some logic and the physical entity that is contained in it and a logic association which helps in the deployment and its use including information type, policy of security and information versioning which is often called as assembly in .NET. A component on the contrary is a class of type .NET.

Public class Classdemo

{

private String GetMessage()

{

return ".NET Component";

}

}

The five forms of Components are discussed below:

Component Specification
This form represents the specification of a unit of software that describes the behavior of a set of component objects and defines a unit of implementation. Behavior is defined as a set of interfaces. A component specification is realized as a component implementation.

**Component Interface**

The interface form presents a definition of a set of behaviors that can be offered by a component object.

**Component Implementation**

The implementation form is a realization of component specification, which is independently deployable. This means it can be installed and replaced independently of other components. It does not mean that it is independent of other components – it may have many dependencies. It does not necessarily mean that it is a single physical item, such as a single file.

**Installed Component**

The installed form is an installed (or deployed) copy of a component implementation. A component implementation is deployed by registering it with the runtime environment. This enables the runtime environment to identify the installed component to use when creating an instance of the component or when running one of its operations.

**Component Object**

A component object is an instance of an installed component. This is a runtime concept. Similar to OOP, a component object in COP is an object with its own data and a unique identity, which performs the implemented behavior. An installed component may have multiple component objects (which require explicit identification) or a single one (which may be implicit). Components provide a service without regard to where the component is executing or its programming Language.
A component is an independent executable entity that can be made up of one or more executable objects.

The component interface is published and all interactions are through the published interface.

Components can range in size from simple functions to entire application systems.

Components provide a service without regard to where the component is executing or its programming language.

A component is an independent executable entity that can be made up of one or more executable objects;

The component interface is published and all interactions are through the published interface;

Components are more abstract than object classes and can be considered to be stand-alone service providers.

**Steps in Component Based Software Development Process**

- Finding the components which may be used and re-engineered in the system.
- Select the components which meet the requirements of the system.
- Alternatively, create a proprietary component to be used in the system.
- Adapt the selected components so that they suit the existing component model or requirement specification.
- Compose and deploy the components using a framework for components. Replace earlier with later versions of components.

**Component-based approach**
Development process separation. There is a difference between the separation of development process & the components seem to be different as they are developed & used in the other products during the start up of the development process.

Assessment of components: The assessment of various components provides the advantage if the process needs to be identified particularly & the repository of components are the results of the process those including components specifications, descriptions, documented tests, and the executable components themselves.

For discussing the specification of CBD process we will be using the basic SDLC model called as Waterfall model but this example can be simply applicable also for other processes which involve the development. The phases which are crucially involved in the process of waterfall model are: Specifying the requirements, Analysis & Software Design, implementing, testing, release and maintenance. The idea behind the CBD approach is re (using) the current components instead of implementing them straightaway whenever possible. Hence the availability of existing components must be considered instead of being already available in the requirements and design phases. The final phase where the software gets installed or implemented rarely include coding for the function implementation, but the available components are selected, and is adapted according to the design requirements. The functionalities which are not provided by the existing software component needs to be implemented properly in the CBD approach and the stake holders will be considering whether the new functionalities will be implemented in the form of the new components which are re-usable in future prospect. The glue code which is responsible for connecting the components and enabling the intercommunication between them and also solving the mismatching between them is called an inevitable part of the implementation of a component based system. The glue code can be generated automatically in the situations when there is full integration support. The simplified version of CBD process is shown in the Figure 2.1. It also assumes the selected components are used respectively and are very closer to the sufficient units which is used for the identification in the process of designing so that the adaptation and selection process are significantly required very little efforts than the implementation of components.
The process related to the system development is further shown in the figure and not for the supporting processes. The processes are shown in Figure 2.2.
It can be performed independently of each other, but certainly there are activities that help in bridging these processes including: Which components will be a subject for searching, what type of verification is required, which types of verified components exist – these are similar decisions as staring points of the component assessments which originate from the system development process. Similarly, the questions such as which functions will be provided by the components being developed, which requirements will be posted on the components, are related to the systems requirements. How these “crosscutting” activities will be implemented, and how these processes will be integrated, depends on type of component-based process. We will be discussing the activity related to every process of this model then we will be discussing in detail the every phase.

**Requirements Phase**

This phase comprises of the collection of requirements, elicitation, and analysis of requirements and the specification of the requirements. While in a non-component based approach the specification of requirements is the development input for the system. In a CBD approach the things are quite different as the requirements will be for the existing available
components and not in the general terms. This approach can be compared with obtaining a suit by order from a tailor who will make the suit according to our wish, or by buying a suit from a shop. In the second case we could not get any suit we wish, but take one available that suits most to our wishes.

**Analysis & Design Phase**

The design phase of component-based systems follows the same pattern as a design phase of software in general, it begins with a system analysis and a conceptual design providing the system overall architecture and continues with the detailed design. The architectural components will be identified by the help of system architecture and are not necessary to be as same as the components implementation but their identification and specification are to be done within the detailed design as assemblies of the existing components. As soon as the design phase is being identified and prepared so the next phase is analyzing the requirements according to the design prepared as this tells what and how the things need to be taken care of in the future. This helps in the development of software with the complete software specification.

**Implementation Phase**

This phase is comprised partially consisting of coding which is called as actually the more pure component-based approach is achieved in this phase, and involves less coding. This phase focusses on selecting the components and integrating it into the system although this may require an additional extra effort. The process of components selection should ensure appropriate usage of components as a selection with respect to their functional and extra-functional properties.

**Integration Phase**

In a non-component-based development process the integration phase includes activities that build the systems from the incoming parts. The integration phase does not include “creative” activities in the sense of creating new functions by production of new code, and for this reason there is requirement to automate and rationalise the process as much as possible. The phase is however very important as it is the “moment of truth”; many problems become visible due to architectural mismatches of the incoming components, or due to unwanted behaviour of different extra-functional properties on the system level.

**Testing Phase**
This test is concerned with verifying a system against its specification including the functional and non-functional testing. In case of waterfall model the testing is performed after the integration of system but this practice exhibits many limitations. In comparison a more realistic model in which the test is performed for the units of the software system. The tests performed in isolated components are usually not enough since their behavior can be different in the assemblies than performing in another environment.

**Release**

The release phase includes packaging of the software in forms suitable for delivery and installation to the ultimate clients. The CBD release phase is not significantly different from a “classical” integration.

**Maintenance**

In this phase the implemented software needs to be updated on the regular interval according to the occurrence of updates and repairing the software as and when the software causes problem.