

# INTRODUCING EXPERT SYSTEMS FOR ENHANCING THE QUALITY OF SERVICES IN CLOUD COMPUTING

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## ABSTRACT

*The technology so called latest becomes outdated just the next day it is released. Cloud computing is not new to this world. It is considered as one of the most emerging arenas of computer science in recent times. It is providing the excellent facilities to business entrepreneurs by flexible infrastructure. Although cloud computing is facilitating the information technology industry the research and development in this arena is yet to be satisfactory. Our contribution in this section is advanced survey focusing on cloud computing services by implementing expert techniques. We would be providing a better quality of services by cloud computing by implementing Expert Techniques*

**Keywords:** *Cloud Computing, Data Globalization, Flexible Technology, Dynamic Server, Risk Reduction*

## I INTRODUCTION

Cloud Computing<sup>[2]</sup> is a technology that has accelerated the use of resources, internet, storage, server, services and their accessing mechanisms. It has provided globalization of these resources which can be accessed without personally acquiring them. It has presented a flexible technology which reduces the cost, time and provided scopes for future technologies. It is a superset of all the technologies that encircles the application and makes it available for other users. It acts as the underlying architecture which is accessed by the users. Cloud Computing is an abstraction of technology, resources and their location. The key issues in Cloud Computing is networking, Large storage space, Uninterrupted Connections, hardware to implement the applications and software which can act as an interface between the user and the application. Users are not aware these underlying technologies used to provide the services only that resources they wish to purchase available on Internet.

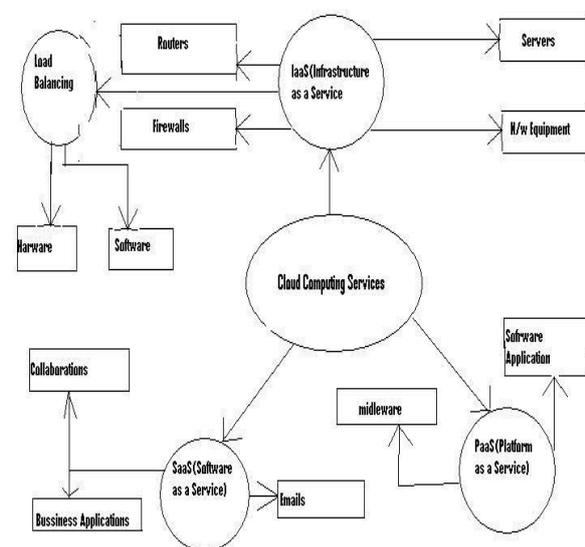
Cloud computing changes the way we think about technology<sup>[2]</sup>. It is a computing model providing web based software middle ware and computing resources on Demand<sup>[3]</sup>. Cloud Computing has three main pillars: System Application, Large Storage Space and Connections. All these three technologies are independent terms and they stand all alone. We combine all three technical terms under the roof - Cloud Computing. A cloud is formed by encapsulating system application, Storage space and Connection. System application covers the system architecture which includes the hardware and software needed in the formation of Cloud.

### 1.1 Cloud Computing Services<sup>[3]</sup>

There are mainly three services offered in a cloud computing:

- a. Infrastructure as a Service (IaaS): This service includes Servers, Routers, Network Load, and Space Allocation. As the name implies it works on the infrastructure that is the configuration. For Example launching a web site one needs a Domain name and Hosting Space. The user is provided with the facility that he can either create his own server or give the charges for Hosting. The hosting charge refers to the Space which is being allotted to the user for his web site. It is the responsibility of the Cloud owner to maintain the Processing speed; Database updating and connectivity. The user is free from tackling the problems of Hardware needed to maintain his web site. He just needs to pay according to his use and enjoy the services. This service is mostly applicable for a Small Entrepreneur who has just established his business.
- b. Platform as a Service ( PaaS ) : This is most applicable at an instance when one needs the data to be entered. For example when you fill a registration page user is provided with a platform on the website to fill his information either to register for a service or apply for a post. This is a section which acts like a middleware. Providing a platform for a user to enter his details and forwarding the data to the desired Company. It is facilitated with user interface.
- c. Software as a Service: This deals with the software which is provided as a service to a user. User pays for the application as per the terms and condition. It refers to the collaboration with a service. The user use the application and pays according to his needs. For Example: a company uses Google application for email. The company ties for the service for the time period or as per the terms and condition and gets the access and copy right accordingly.

Figure 1. Cloud Computing Services



## II RESEARCH OBJECTIVE

Our Research started keeping in the mind the problem which is being faced by the users. We had an aim to improve the Quality of the services offered by Cloud Computing. The general topic in concern was Speed with security. When we make something global and common for every user there is a chance of data being misplaced or stolen. Moving forward we first decided to mark all the negative point of the current technology. Our research enabled us to point few things which needed the favour:

- a. Data Security and Speed.
- b. Collaboration Issues
- c. Switching Cost.

### **2.1 Data Security and Speed**

When a user imports his data on any Cloud he makes it Global that is he makes it available for the user who is in the network. A thing that is global needs more security than the thing that is private. User takes risks with his data with an aim to keep secured from the HACKERS.

As Discussed Cloud Computing is not a technology, it is technique to make resources available for the user in a view to make it Global. The thing that is global and easily available for every one invites more and more user to use the service. This creates a problem of Overloading and hence decreases the accessing speed.

### **2.2 Collaboration Issues**

Using the services of Cloud Computing User has to bind himself with the services. This creates a Problem with the user. Even if the user is not satisfied with the service he has follow the terms and condition of the technology. Some time continuing with the service creates a Problem and increases the Cost.

### **2.3 Switching Cost.**

If a user using a particular service is not satisfied with the service he chooses to switch from one service to other. This creates a Problem as well as increases the cost as he has already invested for one service and now moving to the other service increases cost as well as time.

## **III RESEARCH METHODOLOGY:** <sup>[9] [10] [11] [14]</sup>

We would introduce four Expert techniques for improving the quality of services in Cloud Computing.

1. Fuzzy Computing.
2. Evolutionary computing
3. Neural Computing
4. Probalistic computing.

**3.1 Fuzzy Computing** <sup>[14]</sup> In the real world there exists much fuzzy knowledge , i.e., that is knowledge which is vague , imprecise, uncertain , ambiguous , inexact or probalistic in nature .Human can use such information because the human thinking and reasoning frequently involve fuzzy information, possible originating from inherently inexact human concepts and matching of similar rather than identical experiences .We need a technology which not only answers like humans but also describe their reality levels. These levels needs to be calculated using imprecision and the uncertainty of facts and rules that were applied.

**3.2 Evolutionary Computing** <sup>[15]</sup> Evolutionary Computing refers to a group of problem solving techniques which are based on biological evolution such as natural section and genetic inheritance. These techniques are randomly applied to a variety of problems, ranging from practical applications in the industry and commerce to leading edge scientific research.

**3.3 Neural Computing** <sup>[16]</sup> aims to design and artificial brain which can manipulate the problems as a human brain do. It is a term which is used to investigate how biological nervous systems accomplish the goals of machine intelligence but while using radically different strategies, architectures and hardware and to investigate

how artificial neural systems are designed that try to emulate some of those biological principles in the hope of capturing some of their performance.

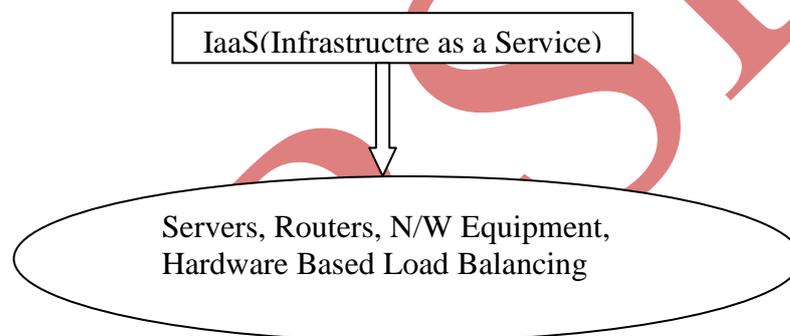
**3.4 Probabilistic Computing**<sup>[17]</sup> is Based on or adapted to a theory of probability. It refers to a model where there are multiple possible outcomes, each having varying degrees or certainty or uncertainty of it's occurrence. It is directly associated with randomness.

#### IV PROPOSED METHODOLOGY

We have divided the complete proposed methodology in four modules.

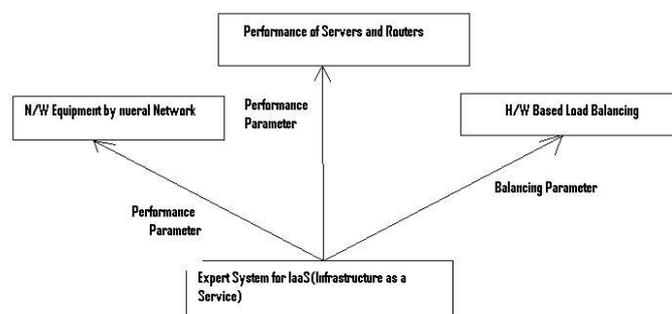
##### 4.1 Module 1

Implementation on IaaS (Infrastructure as a Service ) : Services provided by under this tag line in Cloud computing encapsulates servers , network equipments , routers, firewalls, hardware and software based load balancing on servers and routers .



##### 4.1.1 Implementation: Tier 1

1. To enhance the services at routers and servers. Neuro Fuzzy technology will be implemented in cloud computing environment to enhance the quality of services in cloud computing environment.
2. Performance of Network equipment and its quality of services will be improved with using multi objective functional programming like genetic algorithm.
3. Hardware is highly complex and has unpredictable behaviour. This can be anticipated with the help of neural network.



**Figure2: Tier 1 Implementation at IaaS**

## 4.2 Module 2

Implementation on PaaS(Platform as a Service): Platform in Cloud Computing serves as a middle ware and web application. Fuzy Nuero Technology is being implemented in to increase the Quality of Services in PaaS as shown in the figure given below:

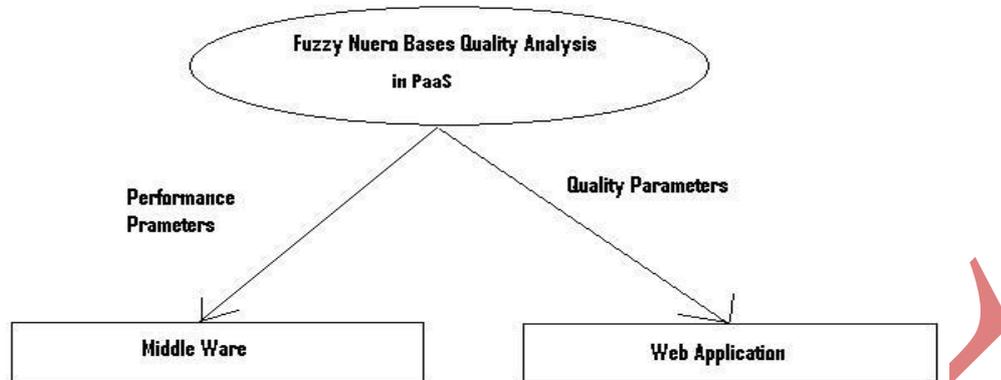


Figure3: Implementation at PaaS

### 4.2.1 Tier 2

Quality analysis at PaaS(platform as a Service ).PaaS mainly works on web application and web application which serves as an Interface in connecting the server to the Clients. The services of PaaS may be enriched if quality at web application level and middle ware level is ensured. At this tier we follow the following steps at PaaS:

1. Neuro Technology Applied to Middle ware to enhance the connectivity and interface between the connectivity nodes.
2. Fuzzy technology is applied at web application to provide quality services to the users.

## 4.3 Module 3

Business Applications, services Software and collaborations are major strategic points by which quality Analysis may be conceived. We use nuero based Fuzzy Techniques in enhancing the quality of Services provided by PaaS in Cloud Computing Environment as shown in the figure given below:



Figure 4: Implementation at SaaS

#### 4.3.1 Tier Three

At this tier we take SaaS as consideration which works on collaborations, emails and business application .We apply the following steps at this tier:

1. Fuzzy technology is applied on the collaborations based structure to give the clear and exact details of the bond the company is working on
2. Fuzzy Neuro Technology is being employed on business applications to provide the quality services to the users.
3. Fuzzy Neuro Technology is being employed on business applications to provide the quality services to the users.
4. We apply quality parameters of neuro technology on Service software to yield the quality of services.

#### 4.4 Module 4

Though IaaS , SaaS, and PaaS are major decision point in assuring QAS at cloud computing based model, if combined all three tiers together and if quality parameters are taken into consideration then we can develop as Expert System for ensuring Quality of Services in Cloud Computing environment.

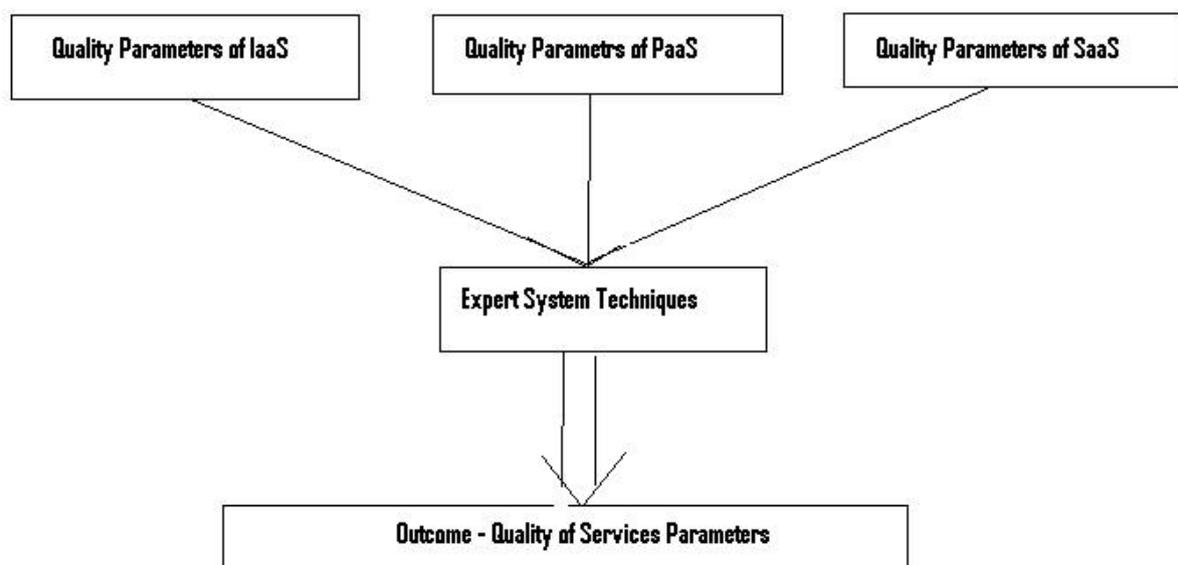


Figure 5: Quality Services as Outcome

#### 4.4.1 Tier Four Proposed Outcome

We apply the quality parameters on IaaS, PaaS, and SaaS and we get the output as the quality of services in Cloud Computing. We employ the expert systems which work on the services to give the desired output. The quality parameters of IaaS, PaaS and SaaS are combined and expert techniques are implemented to have the quality services in Cloud Computing.

## V CONCLUSION

The implementation of expert techniques can result in highly sensitive and progressive response by the clouds. The cloud is meant to fulfill the requirement of an entrepreneur as well as the customers. Our aim is to develop an intelligent Cloud which can work and can chose the services at its own without wasting time and extra cost. Often we have seen the user is not satisfied with the service and tries to switch from one server to the other and in every server he faces one or the other problems. There is no overall solution to the problem and user has to face the problem. This results in the loss of an Entrepreneur. We would work in sorting out this types of problems where are user need not to switch from one server to the other and can be given a proper choice .The other step which will be involved in this will be that there will be interconnections between the clouds so that the user of one server can access the application of other servers and would just pay for the thing that he used. We have limitless application running currently .The current demand is to develop a computing or intelligent cloud which is as equal as a human being. Implementation of soft computing in a cloud computing seems to be an easier task to think on but has a vast problems to work on. This opens new arms for research and provides a better outcome to the users.

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